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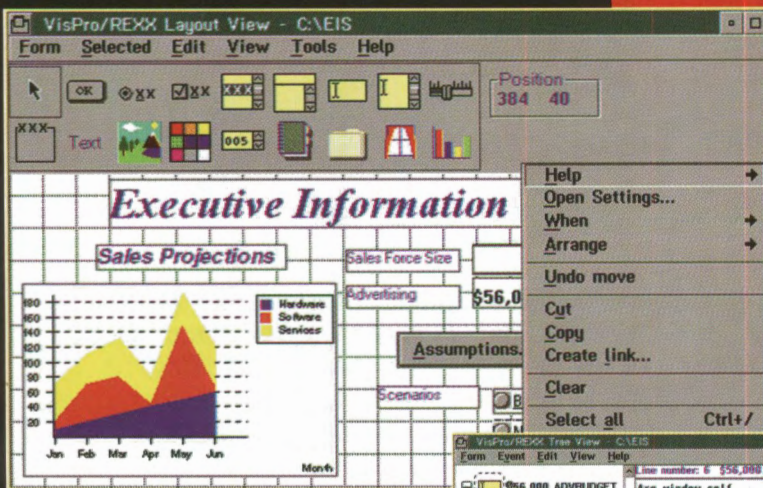
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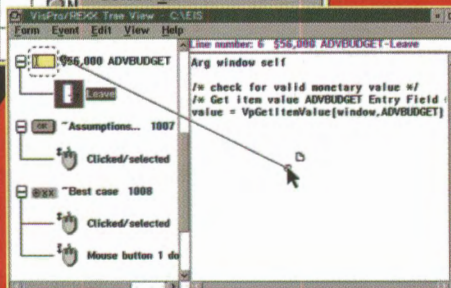
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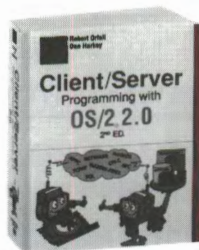
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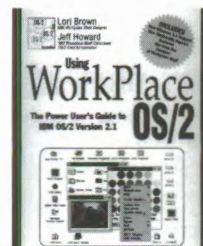
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PUBLISHER'S NOTES

SOFTWARE PERFORMANCE AWARDS

Joel Siragher

STARTING THIS MONTH, we will be kicking off the tradition of recognizing and rewarding excellence.

Two awards will be presented: The *OS/2 Monthly Performance Award* and the *OS/2 Monthly Application Award*. The first of the two awards will be the OS/2 Monthly Performance Award, and will be presented for software that takes advantage of OS/2 power and performance. This award was inspired by, and presented this month to Toni Pereira, creator of Clear and Simple's Performance version 2.1.

The second of the two awards will be the OS/2 Monthly Application Award, presented for ease of use, usefulness, documentation, integration, and dollar value. The OS/2 Monthly Apps award this month goes to Relish by Sundial.

We can only give awards for software we know about. Please make sure you contact our office with your product info.

User Groups, and Shareware, and Team OS/2

There are changes still being made here at *OS/2 Monthly*. Make sure you check all of them out..

We are adding a monthly User Group Spotlight. The first Spot Light falls on David Sichak and the San Diego OS/2 User Group. David is well know for getting his usergroup newsletter out in electronic form. It can be found on the "Fernwood 2" BBS. (203-483-0348 8/N/1). We are also featuring a shareware review section by Steven Mathesius.

Next month we will be kicking off our Team OS/2 Column. It will feature a cast of alternating members, sharing their experiences and ideas on promoting OS/2.

OS/2 Technical Interchange

The Phoenix Technical Interchange was an interesting experience. There were over 2000 happy people wearing OS/2 on their shirt sleeves. Unfortunately, I wasn't able to all of the seminars, as I was quite busy meeting many of the brilliant people responsible for OS/2. In addition I also met Vicci Conway, the Compuserve Team OS/2 forum leader. While there I concentrated on visual based programming products. Sometime in the next the coming months Larry Finkelstein(Golden Compass) and Tom Rawson (4OS2) will be turning in articles on their accounts of the Phoenix show.

OS/2 Seminar Schedule

IBM Device Driver Show, July 20-22 at the Fairmont Hotel, San Jose, California.

The PSP Technical interchange (formerly know as the OS/2 Technical Interchange) dates are Aug 29 thru Sept 2 at the Walt Disney World Dolphin Hotel, Lake Buena Vista (Orlando) Florida.

Electronic Contact

For those of who need to get in touch with us electronically, try section 4 on the new OS/2 vendors forum to Compuserve. Type Go OS2AVEN at any prompt.

If you would like to send us private email, the magazines Compuserve ID is 71333,2632. Our internet ID is 71333.2632@compuserve.com. We also frequent the Shareware BBS (703)385-8450, address posted mail to me. Our fidonet address is 1:109/357@fidonet.org. Our GENIE address is JOELSIR.

EDITORIAL

HELLO COMPUTER!?!

Brett Kotch

OS/2 2.1, unlike its predecessor, 2.0, did not debut a whole potpourri of technical advances over the present state of computing, but it enabled one to harness the power and flexibility that OS/2 established with 2.0. The achievements of 2.1 lie mostly in enabling OS/2 to migrate from the desktops of developers to the desktops of users. In this issue, Edward S. Hasicka explains the benefits of 2.1 and why you will stop peeking over the shoulder of your favorite developer and purchase 2.1 for yourself. In addition, we take a close look at one area which has always been a touchy one in OS/2, and provide the answers to the questions you have been asking about SCSI and OS/2.

But while there are some major additions to OS/2, there is one small one that I believe will define how we compute. While we are not yet at the stage where we can efficiently and effectively talk to our computers, we are at the dawn of the day when we will erode the machine/flesh barrier, and make machines easier for humans to interact with. I do not mean to insinuate that the varied mindless sounds that one can link to an animated window opening up are anything but extraneous, but there are many cases where sound can assist the computer in being, well, more human.

Just as graphical user interfaces are used to assist people to get their job done in a more efficient manner, so will sound. We will see an emergence and development of sound that closely parallels the path that GUIs have taken.

While the familiar pop-up box has its uses, there are many cases where the integration of sound with a GUI will show its benefits. Pop-up boxes are notorious for popping up at all the wrong

times. Some programs which have been started in the background need to pronounce their completion by sending up a pop-up box, stealing the focus, regardless of the delicate work that we might be doing. Whether that work is detailing a difficult formula in Mathematica or painstakingly manipulating bits of a picture, that box will interrupt us and steal the focus from the application.

In the near future what we will see is operating systems being more — polite. A message box will only be sent to the screen and steal the focus if input hasn't occurred within the last X number of seconds. If input has occurred, the computer will kindly tell us, audibly, that such and such a process has finished. The time criteria would guarantee that there is a warm body sitting in front of the computer and would politely notify that user of the new status.

What makes this all work seamlessly is OS/2's ability to preemptively multitask. Windows' cooperative multitasking forces productions to work in a sequential order. Programs need to complete one task before they can start another. It must wait for the current activity to finish before windows can notice mouse or key clicks. This linear execution makes it very difficult for Windows to achieve the politeness that OS/2 can.

Yet there are times when a process just cannot finish a task without robbing the input queue and forestalling any input until it has finished. This results in the pointer changing from a pointer into a clock. Why must we stare at this clock until the process has finished its work and relinquished the input queue? For some processes this

could take up to five or ten seconds, or more! Surely within that time we could find something more productive to do at our desks.

Thanks to System Sounds For OS/2 we need not stare at the clock. System Sounds for OS/2 is an application which allows the user to associate sound with any message that is sent in OS/2. Considering that virtually every action within OS/2 is achieved by sending a message, the possibilities for the useful application of this software are enormous. It is much more robust in its application than the sound possibilities that come with OS/2 and the Multimedia Kit. Along with the application, one can purchase the developers kit, which will bring to the present some of the ideas that this conversation has stirred up.

And while you are working on some of those ideas, you might just wonder whether or not some of the variables you entered into your spreadsheet are correct. How would you go about verifying that those numbers are the same numbers in your notes? Well, how about asking the computer to read back those numbers to you? Creative Labs includes, with its SoundBlaster card, a text-to-speech utility, Monologue For Windows, that reads text, numbers and data from your spreadsheet or desktop publication, enabling you to have assistance in proof-reading those numbers.

The computer is no longer a collection of cleverly placed silicon pieces that we look at — as the personal computing environment continues to mature, and processing power continues its exponential growth, we will continue to find new ways to incorporate humanity into computers, and sound is the first step.

Dear Mr. Kotch:

I just received the sixth issue of OS/2 Monthly and am relieved to learn that the reason I haven't received issues for the months of September, October, and November wasn't because you no longer liked me after the letter I sent you. I'm glad to hear you're continuing to publish and look forward to subscribing for some time to come.

Several points jumped out at me as I perused this issue, and I would like to comment on them:

Editor's Corner:

I feel the real reason that MS Windows continues to be popular despite the advantages that OS/2 purports to have is that it works. The applications are there and the support is there and people have become comfortable with it. OS/2 doesn't have the large base of applications written specifically for it available yet, there is another learning curve after switching to it, and there are just some things it doesn't do. Given time, I believe that OS/2 will find its niche in the computer marketplace, right alongside MS Windows.

On the Eve of Installation — Beginner's Slope:

Mr. Zinsmeyer, I wish installation of OS/2 only took 50 minutes. All my installations take at least three hours, what with patches, fixes and reboots. For OS/2 "Upgrade" customers, the hard drive where OS/2 is going to live after installation must have DOS already present, regardless of the final configuration, otherwise it will abort the installation.

This inability of OS/2 to run DOS-based Backup Utilities is important. Once OS/2 is installed, all backups made with these utilities are unusable. Which means that companies and individuals making backups using a cascading schedule will lose access to those archive sets unless they install OS/2 concurrently with DOS, which is silly if OS/2 is really a "better DOS than DOS." Also, those who are used to backing up 40 megabytes onto something less than thirty-three 1.2 MB or twenty-nine 1.4 MB disks will be surprised the first time they perform a backup and don't have lots of disks on hand.

Another thing to know is that just because the system you own has met the "minimum requirements" — 10 MB of RAM, two 40 MB (IDE on an AT Bus) hard drives, two 1.2 MB floppy drives, a Logitech mouse, a Paradise (Western Digital based) SVGA board and on NEC Multi-Sync 3D monitor — that doesn't mean OS/2 will install, much less work. Don't be surprised if you're forced to make patches and substitute files during the installation

process. The real problem is that getting compatibility information out of IBM is like pulling teeth from a chicken: not only is it impossible to get an answer over the phone, but the "Hardware Compatibility" folder that comes with the system is a joke. This means you'll have to keep DOS around just to handle "incompatible hardware," which is silly if OS/2 is a "better DOS than DOS," now isn't it? On the High Performance File System, why use the darned thing if you can't format floppy disks with it? On the DOS Bootable Disk, the file COMMAND.COM is automatically copied when the disk is formatted with the /S (system) parameter, so it won't need copying again. And on your note concerning shutdown and reboot after installation: Why? The Installation Manual doesn't address this sequence of events, and there is no earthly reason to need it. And trust me, if you do need to shutdown/reboot to keep from corrupting your files, it's a "bug."

In The Trenches:

I find it amazing that Eric Pinnel would criticize people who use Windows NT's proposed features to compare it with OS/2 2.0. For months before OS/2 was released, all I read about was a comparison of OS/2 2.0 with Microsoft Windows using the features that were expected to be incorporated into OS/2. Fair is fair.

Also, for Mr. Pinnel's information, OS/2 won't work with software that "access the hardware directly," like backup utilities, some communications programs, disk maintenance software, and other unnecessary items.

And, as far as support goes, IBM now doesn't offer twenty-four hour worldwide support for software and hardware it manufactures, so why expect anyone else to offer it?

And you're right, Mr. Pinnel, IBM's OS/2 has lots of "bug-fixing and cleaning up, as well as the necessary drivers" to provide. Windows works now. Today. With my system. When I installed it. I don't see any reason to expect that NT won't do that either.

Thank you for your time and please, don't confuse me with someone who hates IBM and wishes all OS/2 users a special place in a dark room. I would really like to see OS/2 come into its own. It's just when I read things printed in OS/2 Monthly that I know are not correct, accurate, or fair, it tends to break out the letter-writer in me.

Sincerely,

*Michael Houston
North Chelmsford, MA*

BEGINNER'S SLOPE

CUSTOMIZING YOUR HOME

Changing the colors of your OS/2 session or reorganizing your desktop will not make your applications run any faster. Changing the default "view" that is activated when you open a directory will not make your system use less RAM. Knowing the difference between a "flowed" and "non-flowed" grid will not free up any space on your hard drive. However, despite the lack of benefits from a speed or a resource standpoint, it's quite important to many people that their OS/2 desktop be well organized. After all, it can certainly save a user time in finding a file or an application if his or her folders show some logical thought behind their arrangement. You may not give a darn about appearances, but perhaps you should, because a sharp-looking screen is more likely to interest a passerby in OS/2 than a drab one. This month we'll discuss how different views of a folder can be set, how colors and backgrounds can be customized, and we'll give you a few tips for personal productivity.

REVIEW THE COMMAND PROMPT

If the reader has not yet used DOS very much and has not yet become familiar with the text-based functions of OS/2 that are invoked at a command prompt, then some practice is strongly recommended. "Command prompt" refers to the place the cursor appears, starting near the top of a blank screen, when a DOS or OS/2 window is used (which includes full-screen windows as well). "Command prompt" is also the icon title given to the folder — found in the OS/2 system folder — where an OS/2 window, a DOS full-screen session, and so on, can be invoked.

The reader should know that the

Bill Zinsmeyer

**Recall that just
about every
component
visible on the
screen is an
object.**

command MD stands for "Make Directory," and should know what a directory is. If not, he should read the command reference and get some practice. Directories are always given the status of folder in the Workplace Shell, although the reverse is not necessarily true (many folders can be found that do not correspond to actual directories).

VIEWS OF A FOLDER

Recall that just about every component visible on the screen is an object. At this point, even if you haven't read previous installments of "The Beginner's Slope," you should be well aware of how to bring up a Settings Notebook. Begin to bring up the Settings Notebook for an actual directory, not just a regular folder, but stop when the cascade menu (submenu) for Open is shown. Note that three other options should be possible under Open: Icon View, Tree View and Details View. Settings is the first entry in the list, but Icon View is set as the original default. These three views are the most common exam-

ples of OS/2's ability to show more than one view of an object

If you haven't done so already, experiment with these options by clicking on each until you become familiar with the results. To change the default view, continue to access the Settings Notebook and go under "Menu." Highlight "Open" and then "Change Settings" and change the default. This process was discussed at length last month, just in case you have the previous issue handy and wish to review the procedure in more depth. The Details View is probably the most appropriate one to represent an actual directory, especially if the directory holds a great number of files and subdirectories. Experiment! The best choice is up to each individual user. With a small or moderate number of entries, Icon View or Tree View might work well as the default. If you'd prefer to use Icon View but have just a few too many entries to see at one time, consider making the icons smaller for that folder. The control for the size of the icons is usually on the first page of the settings, under View.

These comments at this point apply just as well to "organizational" folders (often created using a template) as to folders that represent actual directories. Directory folders are mentioned prominently just so the reader might consider defaulting all directory folders to display the Details View.

This is by no means a firm rule; it's just a convention this author feels comfortable with, and unfortunately the change must be done manually, one folder at a time, because there's no option to change the default display of all folders in one sweep.

Not only is the Details View convenient because it shows a large num-

ber of entries in a small space, but it also bears a resemblance to the list that results on screen from the DIR command; thus "Details View" serves as a reminder that the folder being viewed represents a directory. The Details View always results in small icons, but as mentioned above, small icons may be useful for the Icon View or Tree View, as well. By the way, at first glance the Details View might seem to prevent objects from being grabbed and moved elsewhere, but such is not the case. The objects can be moved just as always under Settings on the same "page" as the icon display is the Format control. Non-grid is the original default here, which means that the icons can be scattered or moved to a variety of positions. The two "grid" choices are Flowed and Non-flowed. In both of these cases the icons are moved to the left of the display area and the icon text is not below but is shown to the right of the icons. The difference between the two is simply that Flowed will break up a long list of entries and start a new column next to the first, while Non-flowed will let a long list disappear at the bottom therefore the user must scroll down for lower entries.

Keep in mind that the main desktop itself is a folder, so Flowed, Non-flowed, Icon size and the other custom settings are all valid options to help organize the main desktop.

COLOR SCHEMES

More than one person has wondered why OS/2 initially loads up with rather drab colors. There is an answer: IBM tested OS/2 extensively with handicapped people, a subgroup of whom are those who are color-blind. It was determined that the shades of gray one sees when OS/2 first runs are the easiest for color blind people to see. Thus the initial default colors were set to make

the Workplace Shell easier to use for people so handicapped.

But let's be honest; most of us who can see colors want OS/2 to appear more flashy. Changing colors and creating a new color scheme is not difficult; most users can figure it out for themselves. However, some of the names given the various individual colors are difficult to grasp, even after experimenting with different values, so we'll briefly cover a few of those now. Note that by "names" we are not referring to the "Winter Scheme" or the "Summer Scheme;" we're referring to names such as "3D Highlight Bright" that appear in the actual list of colors within a color scheme.

Color schemes are created or customized via the Scheme Palette which is in the System Setup in the main OS/2 folder. As one alters the

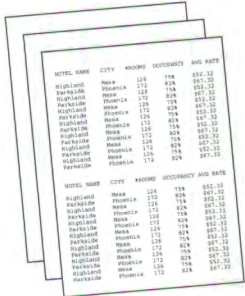
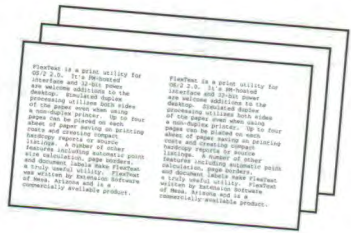
colors to get some practice, one will notice that the terms "active" and "inactive" are used quite often.

These terms refer to which folder, window or application has the attention of the Workplace Shell at any one time. Put in proper terms, the active window is the one that has the "focus." This is almost always the window in which the user is currently working. It is usually assigned a bright color to provide emphasis (you've probably seen this phenomenon hundreds of times). Only one window can have the focus and all the others will be "inactive."

"Application Workspace" is one color assignment that many users puzzle over. It doesn't deserve so much attention because it doesn't show up very often. It makes a very brief appearance as the Master Help Index is

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loaded and, as the name implies, some OS/2 applications use this color as a background for their window.

"Dialog Background" also sounds important. This appears a little more often than "Application Workspace;" it is the background for messages sent to the user, such as the shutdown messages, error messages and many "Are you sure you want to do this?" messages. It is also the background for the pages of the Settings Notebooks. "Entryfield/Listbox Background" is another name that sounds confusing but actually does make some sense at the end of the day.

"Inactive Area" specifies the background to the right of the notebook windows, meaning the area that shows the edges of the pages (where tabs are often located) and a small space to the right of the book. Surpris-

ingly, this specification also determines the color shown for the horizontal scrollbar background. Some people might think the setting "Scroll Bar Background" would control both vertical and horizontal, but it only controls vertical. Make "Inactive Area" match "Scroll Bar Background" unless you want your screen to make an unusual fashion statement.

Those are a few of the more strangely-named color settings. There are others, but it's a challenge to figure a few out for yourself.

FINAL TIP

Some beginners are aware that OS/2 has an Undelete feature built in but have been unable to make use of it. The reason is probably that the CONFIG.SYS file needs a small change to activate Undelete. Of course, this is

explained in OS/2's on-screen help facility, but let's assume you're reading article on this a beach in Tahiti or while climbing Mount McKinley and the battery in your laptop just went dead. After you get your laptop recharged, you should look in CONFIG.SYS for the line SET DELDIR = [drive:]DELETE. The line is usually "commented-out" (made inactive) by the statement REM at the start of the line. REM must be removed, the file saved and OS/2 rebooted for Undelete to be available.

What the SET DELDIR line does is specify the destination to which a deleted file will temporarily be written in case you change your mind and want to get the file back. If you do, go to an OS/2 command prompt and change the directory or drive until located at the original location of the file. Simply type UNDELETE and if the file is still available its name will be shown. The space reserved for deleted files is also specified on the same line. Naturally, if the space given is small and several files have been deleted, the chance of restoring a file deleted long ago is slim. One disadvantage of Undelete is that it slows down system performance during deletions so files can be saved.

That's the Beginner's Slope for this month. Please send in any suggestions you may have for future topics that would be useful or interesting.

Bill Zinsmeyer is a programmer and analyst with many years of experience on mainframes who greatly enjoys using OS/2 while learning more about PCs.

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THE WORKPLACE SHELL

FOR THE RECENT WINDOWS CONVERT

For anyone who's used Microsoft Windows, OS/2's WorkPlace Shell seems a little confusing at first. But once you know a few tricks, it's as easy as pie.

Here's the scenario: You're an accomplished Windows user. You've been using it for at least six months, you've learned its shortcuts, its shortfalls, and its undocumented tricks. But now you're moving to OS/2. Oh, sure, it looks like Windows, but once you start using OS/2, you notice subtle — and not-so-subtle — differences.

Consider this your initiation guide to the wonderful world of the WorkPlace Shell.

CARDINAL RULES

Before going any further, let me give you two cardinal rules. If you remember nothing from this article, just remember these two rules; they'll save you a lot of headaches:

1. Use the right mouse button
2. Use the on-line help

Let me explain these rules a little further. As you're probably aware, neither Windows nor the Macintosh uses the right mouse button (in fact, the Mac doesn't *have* a right mouse button!). Rather than leave the use of the right button up to the whims and fancies of each software manufacturer, IBM decided to implement a coherent strategy for its use. Clicking the right button anywhere on the OS/2 desktop — including icons, folders, drive objects, and the desktop itself — brings up a pop-up menu. This menu lists every action you can take on that object. So if there's something on your desktop that you want to manipulate, a drive object, say, and you're not sure how

Lou Miranda



to do it, just point to the drive object and click the right button. All your choices are listed right there.

Secondly, use the on-line help in OS/2. Help comes in many forms. There's the Start Here icon, which gives you basic help in maneuvering through OS/2; the Master Help Index icon, which opens up a window with all sorts of useful information; and the Information icon, which is actually a folder containing documentation on the command-line interface, REXX (the equivalent of DOS' batch language, but orders of magnitude more powerful), and the OS/2 tutorial. And don't forget that a *very important* way of getting help is through the right mouse button pop-up menus that I mentioned previously. There's usually a Help choice in the pop-up menu. Or you can press F1 while holding the left mouse button down on one of the menu choices. That's

the way I most often get help myself, since it's context-sensitive.

OK, now that you know those two important tricks, let's get on to the WorkPlace Shell.

TAKE CONTROL OF THE DESKTOP

The first thing you'll probably want to do once you install OS/2 is to customize it. You know: set the colors and fonts and all that fun stuff. In Windows, this is accomplished through the Control Panel. In OS/2, you use the OS/2 System Folder and the System Setup subfolder. In System Setup you can change fonts, colors, change keyboard and mouse settings, specify country-specific information, and migrate applications from DOS or Windows to OS/2. There's also a system clock in there.

One thing you'll notice about the Color Palette and Scheme Palette is that you can hold down the ALT key as you drag and modify the colors for the entire system, or you can drag colors to just one window. That way you can make your drive A folder have a blue background and your drive B folder have a red background, something you can't do in Windows.

Another feature unique to OS/2 is the use of folders. Oh, sure, Windows has the Program Manager, but it's not very powerful. Try putting a group inside another group in the Program Manager — it doesn't work. It does work in OS/2, though, and that can be very useful. You could, for example, have two main folders: Work and Fun. The Work folder might have 3 subfolders, one for each of the projects you're working on, such as the Finnegan Account (which might contain a WordPerfect report and a Quattro Pro spreadsheet), a Budget folder (which might contain a Quick-

en budget and a Freelance Graphics chart), and a ToDo folder (which might contain a to-do list and a weekly schedule from several of the OS/2 miniapps). Likewise, your Fun folder might have subfolders for DOS games and OS/2 games.

To a veteran Windows user, one of the scariest things in the WPS happens the first time you minimize an application — it disappears! Your application hasn't really disappeared forever; it's just disappeared from the desktop. In order to avoid the clutter that you sometimes get from having many minimized applications, OS/2 puts them in a folder, the Minimized Window Viewer. Don't worry, there are two ways to get your minimized application back. The first is to open the Minimized Window Viewer and just double-

FUNCTION	WINDOWS SHORTCUT	OS/2 SHORTCUT
Bring up Window	CTRL+ESC	CTRL+ESC
List	[double-click on wallpaper with left mouse button]	[press both mouse buttons on desktop]
Toggle between the two most recent applications	ALT+ESC	ALT+ESC
Move sequentially through each open application	ALT+TAB	ALT+TAB
Close a window or application	ALT+F4	ALT+F4
Select a word in an Edit control	[double-click with left mouse button]	<None>
Pop-up a menu describing all available commands	<None>	[click right mouse button over object]

click on your application's icon. The second way is to use a mouse or keyboard short cut. While the mouse is pointing to an empty spot on the Desktop, press both mouse buttons at the same time or press CTRL+ESC. Either way brings up the Window List. Then just double-click on your application's name and you're back in business.

SHORTCUT KEYS

This brings us to the topic of shortcuts. Windows has many of these and virtually all of them are duplicated in OS/2. See table above listing common keystrokes and mouse clicks:

DEALING WITH FILES

Another scary thing in moving to OS/2 is not finding anything that looked even remotely like Windows' File Manager. The Drive Folders seem like a foreign concept at first. But once you realize that files are just objects, and the Drive Folders are just like any other folders, life becomes much simpler.

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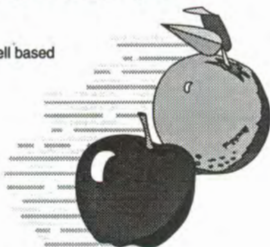
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By default, all folders (including your Drive Folders) list their contents by icon. This is very Macintosh-like, and is great for beginners. But where are the date, file size and file attributes? Enquiring minds want to know!

There are two simple ways to find these things out. Which one you choose depends on how many files you want to look at. If you want to see *all* your files' details, then place your mouse over an empty spot on the Drive Folder, and click the right mouse button. This brings up the pop-up menu we talked about before. Click your left mouse button on the arrow button that appears in the Open menu item. Don't just click on the word Open.

Let me digress here for just a minute. You'll notice that some arrows on the menu are just "flat" arrows, whereas some are 3-D buttons. There is a difference. Clicking on a "flat" arrow or the menu text associated with it brings up a submenu to the side; clicking on a 3-D button arrow will do the same thing. But if you click on the text associated with a 3-D button, that will just select the submenu option with the check mark next to it.

For example, if you click the right mouse button on an application icon, the topmost item in the pop-up menu will be Open, which has a 3-D arrow button. If you click on the arrow button, you'll get a submenu that lists Settings and Program — but notice that "Program" has a checkmark next to it. This means that if you click on the word "Open" instead of the arrow button next to it, Program will be selected automatically. Try it and see for yourself. End of digression.

As I was saying, click on the arrow button next to Open. You'll see four options: Settings, Icon view, Details view, and Tree view. Click on Details

view and — voila! — you'll see all the nitty gritty details of your files.

On the other hand, if you just want to see the details on one or two files, select a file (if you want to select more than one file, hold down the CTRL key while clicking with the left mouse button), then put your mouse over one of the selected file objects and press the right mouse button. Click on the arrow button next to Open, then select Settings. A notebook will pop up (one for each file object you selected). Click on the File tab to the right of the notebook. At the bottom you'll see "Page 1 of 3." To the right of that are two buttons; click once on the one facing right; now you should be on page 2. The notebook is now open to the page that lists the file size, creation date, and attributes. You can even change the attributes now, if you like. While it may seem complicated to explain, this is a very convenient way of inspecting and changing file attributes.

DELETING OBJECTS: A SHADOW OF A DOUBT

Another confusing issue for the Windows veteran is the concept of Shadows. Almost sounds like something from the Dark Avenger! Shadows are actually very useful, though. It's like having two copies of your application or file in two different places, so you can access them from wherever they are kept. And they're better than copies, because if you change a shadow, the original is changed too.

You can create shadows yourself (by holding CTRL+SHIFT while dragging an object with the left mouse button) or they are sometimes created for you. For example, if you want to find a file, you can select a Drive Folder, press the right mouse button, and choose Find from the menu. After you make your se-

lection, the search is carried out and the results are displayed in a new folder. What's displayed is not your real file, but a shadow of it. How do you know that? There are two hints. First, OS/2 colors shadows text gray instead of black. Second, if you press the right mouse button over a shadow, the last option is always Original, which has a submenu containing Locate, Copy and Delete. That way you always know if you're dealing with the real McCoy, or just a shadow of it.

ALL RIGHT, GET TO WORK

What's Windows without all those little productivity applications? Windows Write is great for sending off a quick note, and Windows Paintbrush is good for the budding artist. But I've found that the remaining applications aren't really useful for anything significant. While OS/2 certainly doesn't give you AmiPro or Designer, it does have a greater variety of applications, and one or two that approach real-world applications. OS/2's miniapplications (or "miniapps," for short) are in the Productivity Folder.

One of my favorites is a simple but useful miniapp: Sticky Note. As you might have guessed, it's like an electronic Post-It Note. You can enter any text you want, change the colors and font size (but not the typeface), and keep up to ten of them open on the screen at a time. And of course, after you close down OS/2 and boot up again the next day, they're right back where you left them. A really neat feature is that you can even attach Sticky Notes to other windows. For example, drag a sticky note on top of one of your application windows, and then click its Minimize icon. The Sticky Note will become a tiny yellow icon in the lower left corner of your application window. This way you don't clutter up your screen

with notes, and yet it provides a visual reminder that you have a note to read.

Probably the most ambitious miniapp is PM-Chart. This is a drawing and charting application written by Micrografx, the people who make Micrografx Draw!, Micrografx Designer, and Micrografx Charisma. You ought to try it out — it has very useful features, such as the ability to draw objects (rectangles, circles, lines and curves) in any color, or to rotate, reverse, flip, or fill in objects with bitmaps or gradients. In addition, it has a simple spreadsheet/charting module. While it may not suffice for a presentation to a large corporation, it has more than enough power for use in a club newsletter or in school projects.

OK, WHERE ARE THE GAMES?

Once you've tired of being productive, you can relax with a game. Every Windows guru knows that you can find 2 or 3 games: Reversi, Solitaire, and (new in version 3.1) Minesweeper. OS/2 gives you this and more. In the OS/2 System Folder is a subfolder called, appropriately enough, Games. Inside you'll find Reversi, Solitaire (with fireworks when you win), Cat & Mouse (a cat that chases your mouse around the screen, with occasional stops for rest and a good cleaning!), Chess (in 3-D, even), and a jigsaw puzzle. The last game is kind of neat because you can open any bitmap and use it as the puzzle. Then use the mouse to drag the pieces together until you complete the puzzle. This is as much fun for grown-ups as it is for kids.

MAKING IT ALL MAKE SENSE

You should now feel a lot more comfortable with OS/2's WorkPlace Shell. While it may seem like a big change at first, you'll quickly find that it's much more organized and logical than Windows' combination of File Manager, Program Manager, Control Panel, PIF Editor, and so on. Whereas Windows has a bunch of things thrown together, WPS offers an intuitive, organized layout.

Lou Miranda is an OS/2 aficionado and C/C++ programmer based in St. Paul, Minnesota.

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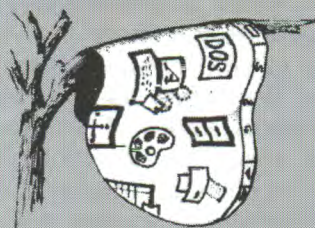
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REXXPLORATIONS

REXX TO THE RESCUE

ABSTRACT

Character string manipulation is essential to any user friendly program. In the past programming languages ignored this need and provided only crude mechanisms for manipulating text. The REXX language, on the other hand, expresses a rich vocabulary of statements and built-in functions for handling character strings. This issue's REXXPLORATIONS examines a few of them, and by example shows their use.

BACKGROUND

The desire to use more natural language constructions when communicating with the computer was one of the noble goals of early programmers. It was understood that it was inherently inefficient to require humans to communicate with computers only in code sequences. Despite this, many popular high-level languages lacked character string manipulation which would have provided the rudiments of more natural communication. Beyond basic arithmetic, algebraic, and boolean operations, these languages provided only the bare-bones ability to move or copy blocks of text of limited size, and perhaps search a data field for a character or group of characters.

The vacuum that existed was not initially felt. Early computer applications dealt with either massive repetition of numeric calculations, in the scientific/mathematical world, or with the business arithmetic of accounting systems.

It was not until the advent of specialized string manipulation languages, such as LISP and SNOBOL, that the needs of string manipulations were first addressed. Within the coding rules and syntax require-

Eloy O. Cruz-Bizet

ments of these new languages were character and literal string manipulation. But these languages, which so effectively handled text, were at the time seen more as esoteric, and limited in usefulness by their "narrow" scope. Yet the lessons learned from the implementations of these languages went far to arouse a demand that comparable functions be expressed in dialects of existing languages, and in the core of new ones being developed.

REXX TO THE RESCUE

Such was the case with the development of the REXX language. It borrows significantly from the best features of other languages, yet despite its many capabilities, remains essentially a character manipulation language. Intended to be a user's language, REXX acknowledges the need for dialog between the end user and the computer. For this communication to be effective, it must occur through the use of plain English, or more precisely, in a natural language of the user's choice. That's not to say that REXX understands English, but rather that REXX programs communicate their purposes more freely, and that the text solicited from the human user is more easily examined and manipulated than in other languages.

Data structures and files created by contemporary programmers and new computer users are more heavily based on character string representations than in the past. This is probably because improvements in the cost of storage and memory encourage a move away from repre-

senting information by cryptic abbreviated codes. Old ideas regarding efficient use of storage have given way to a shift towards more directly usable data. The goal is to impart simplicity to data, on behalf of the less knowledgeable user. REXX aggressively encourages this by providing string oriented instructions and more than 30 built-in functions dedicated to character and text handling. (See Table 1.)

GETTING STARTED

Most programming texts forego trying to teach significant elements of language until the reader at least knows how to request the display of character strings. If you have read any programming language books, you'll probably recognize the purpose of the following short program:

```
SAY "hello" /* display "hello" on the screen */
```

It provides a comfort level to see immediate visual results from the execution of a program. Whether right or wrong, it's important to develop dialog between programmer and computer, or user and computer, because it's encouraging.

Within REXX, the majority of facilities handling character manipulation are implemented as a separate part of the REXX language called built-in functions. Built-in functions are facilities that are available to REXX without the need for external calls. Space doesn't permit a full examination of the 35 string-oriented functions in this installment of REXXPLORATIONS, but we will continue it in future issues. In the meantime, let's use the remainder of this issue's allocation to understand the

fundamentals, and try simple and useful string manipulation tasks.

IDENTIFYING CHARACTER STRINGS

REXX language design philosophy eliminates the requirement for explicitly assigning attributes to variables, such as numeric, floating point, binary, or character. Data attributes, an essential concept in many computer languages, is merely an incidental element with REXX. For example, 315 may be either a numeric value or character string; its identity is determined solely by its usage and context within the REXX program. If forced to describe a REXX variable's data type, it's best to say that it most closely resembles a typeless character string. The term "typeless" indicates that it is not of any particular declared type.

In REXX, strings are defined by placing them in either single or double quotes. When REXX encounters a quote (either " or ') it stops processing and looks ahead for the matching quote. The characters inside the matching quoters are known as literals.

Example 1.

```
"this is a string"
```

```
'so is this'
```

```
'AND this ALSO'
```

The maximum length of a string is 250 characters, but the evaluated length of a combination of strings may be 4 billion bytes, which is large enough to accommodate most requirements of the casual command file writer.

BUILT-IN FUNCTION RULES

You can accelerate your learning of built-in functions by first focusing on

the common aspects shared by them. Before proceeding, we will examine the following general rules governing the use of character manipulation built-in functions.

- Built-in functions have function-names which are literal strings or single symbols. These are taken as constants by REXX.
- A function is said to return a value or the result of its execution. Within the subset of built-in functions which we will discuss, the returned values are a numeric position or length, or another string.
- The string may be null, that is empty, such as "". The null string is considered a valid string, whose length is zero.
- A function's argument is information that will be passed to the function. When it specifies a length, or starting position, it must be a non-negative whole number.
- Parenthesis, shown in syntax diagrams, must be coded even though the argument string may be null. The parenthesis must be adjacent to the function name without intervening spaces, or else it will not be recognized as a function.
- Optional parameters and arguments shown in brackets may be omitted. Also, trailing optional arguments need not be coded.
- In functions that perform padding operations as part of their function, the pad character may be only one character long.

You're invited to review the more detailed syntax and other definitive descriptions of built-in functions in Mike Cowlishaw's book, "The REXX Language, A Practical Approach to Programming", or in IBM's "IBM Operating System/2 Procedures Language 2/REXX, Reference" manual number of S01F-0271.

But now let's move on to specific tasks. Through the use of several examples, we're going to show how to

assign a character value to a REXX variable, and how to connect two or more strings or two or more character string variables via a process called concatenation. Then we'll experiment with testing a character or string's presence in another string, and determine its position within it.

GIVING A VARIABLE A STRING VALUE

In REXX programs, a variable's value is intrinsically a character string. As an aid to the REXX user, a REXX variable that is *not* assigned a value, is initially automatically given a character value of its own name. For example, the variable TAG has a value of "TAG", and the variable toomuch, a value of "TOOMUCH." This is a departure from languages that assign a null string, or worse, the unerased remnants of computer memory as initial values. This presents a certain forgiveness; REXX programs with simple logic errors, such as unassigned variables, work surprisingly well.

Although upper and lower case strings may be used freely in REXX, variables are always assigned their initial value in upper case. Just because REXX variables don't have to be pre-initialized, doesn't mean that we can ignore their initial values.

Now we will discuss how to explicitly assign a character string value to a variable. The following example shows the simplest, though not recommended (by personal bias) method of assigning a string value to a variable. The value string1 is given to a variable string2.

Example 2.

```
/* a REXX program */
string2 = string1 /*variable string2 = characters
"string1" */ |
```

The REXX expression above,

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though syntactically correct is far from clear, thereby making it error prone. It is fully equivalent in this context to Example 3.

Example 3.

```
/* a REXX program */
string2 = "string1" /* variable string2 = characters
"string1" */
```

However, the latter (Example 3.) more reliably, and unambiguously, relates the intent of the programmer. In Example 2, if string 1 were to be assigned another value previously in the program, the program could instantly change context.

One useful, and often necessary, operation performed on character strings involves combining two or more strings to form a single one. This process is called character string concatenation. In REXX, two strings placed adjacent to each other are automatically concatenated. This type of concatenation is termed "abuttal." Two variables or strings separated by spaces are also implicitly joined by concatenation. In this case, any intervening spaces between the two adjoining strings are collapsed into a single space.

Literal strings may also be explicitly concatenated by the use of the concatenation operator "||", as shown in Example 4.

Example 4.

```
stringa = 'ON' "TIME"
say stringa result—> ON TIME

stringb = 'some' "time"
say stringb result—> sometime

stringc = 'Un' || "time" || 'ly'
\ say stringc result—> Untimely
```

Note the single blank or space in strings, despite the number of inter-

vening spaces between the two strings. Also, note that explicit use of the concatenation symbol, "||", ignores the spacing between strings, even though the concatenation operator symbol is spaced away from a quoted string.

FINDING A CHARACTER OR CHARACTERS IN A STRING

Once you have a string in a form you desire, you'll probably want to examine its contents. One of these examinations may consist of a search for the existence of a particular character in the string.

Now is a good time to introduce the REXX concept of the word. A "word," to REXX, is a series of characters delimited on both the left and right by a space, hence the term commonly found in REXX manuals — "bland-delimited word." These words do not have a syntax like English, nor do they have to make sense. They are simply any combinations of characters sandwiched by spaces at either end. To determine the number of words in a given character string, you may use the WORDS function. It will return the number of bland delimited words encountered in the argument string.

In examining strings you may search for characters, or for words. One method is to use the pair of position finding built-in functions POS and WORDPOS. The two work similarly. The content of the first argument of the function is searched for in the second. (See Table 1.) Both the POS and WORDPOS functions return a numeric value, which is the position of the start of the first occurrence of the character string or the word. If a zero value is returned, it's not found.

For POS, the position of the first character is returned. Whereas for WORDPOS, it's the position of the first occurrence of the word that is

returned. Example 5 illustrates both.

Example 5.

```
sentence = "The foxy brown fox jumped."

stringd = POS('fox',sentence) stringd = 5

stringe = WORDPOS('fox',sentence) stringe = 4

if stringd > 0 then ... /*found? */
```

Observe, that in the character string "foxy", which is the second word, the characters "fox" are not blank delimited, and the word is therefore ignored by WORDPOS. Using WORDPOS, the first occurrence of "foxy" found is the fourth word. In this case, WORDPOS returns a numeric value of 4.

The question, "Does the character string exist?" may be answered using the POS and WORDPOS built-in function. The process involves testing the resultant variable for a value greater than zero, since a zero value denotes a *not found* condition. (See last line of Example 5.)

Although we won't be discussing it in detail here, there is a related position-finding built-in function, LASTPOS. This function differs in that it finds the last occurrence of a string.

Having determined the starting position of a string, it is now possible to use this information to perform other manipulations. The REXX SUBSTR built-in function allows you to derive a smaller string from a larger one. SUBSTR has three arguments, one of them coincidentally is the starting position of a string. The other two are the source string, and the length of the string to be extracted. SUBSTR returns the extracted string, or the null string, if the position number is larger than the length of the string. (See Table 1.) But with a little care, this situation can be avoided. Use the LENGTH built func-

tion to check for length of the search string prior to doing the sub-string function.

Let's say you needed to extract the four characters following the first "s" encountered in a literal string. Further, you need the extracted string placed in a variable called extract. Try this program for yourself (see example 6).

Example 6.

```
I/* SUBSTR Example in REXX */
PROGSTART:
phrase = "celery, saltines, zucchini"
/* first find the starting location */

location = POS('s',phrase) /* location = 9 */

if location > 0 then /* extract the */
  extract = SUBSTR(phrase,location,4) /* 4 characters */

SAY extract /* "salt" */
```

OUT:
exit

As with POS/WORDPOS there's a corresponding SUBWORD built-in function to handle extracting with entire words. (See Table 1.)

So far we've examined the nature of character strings and their implementation in the REXX language. Some of the ground rules for their use were also covered. We've also seen a few of the tasks that can be accomplished using literal strings. Experiment with these, in order to gain additional proficiency, and review the literature sources in the bibliography when background is needed.

In the next installment of REXX-PLORATIONS, we will expand our tour, with an examination of considerations of soliciting input strings from users, parsing them for specific information and then formulating responses.

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- M.F. Cowlishaw. *The REXX Language, A Practical Approach to Programming*, Prentice-Hall, Inc., Englewood Cliffs, NJ, (1990)
- M.F. Cowlishaw, *The Design of the REXX Language*, IBM Systems Journal, Vol. 23, No. 4 (1984)
- IBM Operating System/2 Procedures Language 2/REXX, Users Guide*, S01F-0283, IBM Corp. (1992)
- IBM Operating System/2 Procedures Language 2/REXX, Reference*, S01F-0271, IBM Corp. (1992)
- OS/2 1.3 readers may find a simple introduction to REXX in *IBM Operating System/2 Users Guide, Vol. 1: Base Operating System*, S01F-0289, IBM Corp. (1990)
- On-line information is available in OS/2 Version 2.0 in the information Folder *REXX Information* (1992)

Table 1. REXX Character Manipulation Built-in Functions

ABBREV(information,info[,length]) returns 1 if info is equals the leading characters of information.	on the option.	returns the sub-string of string, beginning at the nth character.
CENTER(string,length[,pad]) returns string of length <i>length</i> with string centered in it.	ERRORTEXT(n) returns the message text of error code n.	SUBWORD(string,n[,length]) returns the sub-string of string, beginning at the nth word.
COMPARE(string1,string2[,pad]) returns 0 if string1 and string2 are the same.	INSERT(new,target[,n],[length[,pad]]) inserts new in the string target starting after n.	TRANSLATE(string[,tableo][,tablei[,pad]]) returns a character in string with each character in tblei either unchanged or translated to a value specified in tableo.
COPIES(string,n) returns n concatenated copies of string.	LASPOS(needle,haystack[,start]) returns the last occurrence of needle in haystack.	VERIFY(string,reference[,option][,start]) verified that string is composed of only characters from reference.
C2D(string[,n]) returns the decimal value of the binary representation of string.	LEFT(string,length[,pad]) returns a string of length <i>length</i> containing the leftmost characters.	WORD(string,n) returns the nth blank-delimited word in string.
C2X(string[,n]) returns a character string representation of string in hexadecimal.	LENGTH(string) returns the length of string.	WORDINDEX(string,n) returns the character position of the nth word in string.
DATATYPE(string[,type]) tests the string and returns its data type.	OVERLAY(new,target[,n],[length[,pad]]) overlays new onto the string target starting at n.	WORDLENGTH(string,n) returns the length of the nth bland-delimited word in string.
DELSTR(string,n[,length]) deletes the sub-string of string, beginning at position n.	POS(needle,haystack[,start]) return the postion of needle in haystack. 0 means not found.	WORDPOS(phrase,string[,start]) searches for the first occurrence of words phrase and returns the word number of the first word of phrase in string.
DELWORD(string,n[,length]) deletes the sub-string of string, beginning at the nth word.	REVERSE(string) returns string swapped end to end. "ABC" --> 'cBA"	WORDS(string) returns the number of bland-delimited words in string.
D2C(wholenumber[,n]) converts the character string which is the binary representation of the number.	RIGHT(string,length[,pad]) returns a string of length <i>length</i> containing the rightmost characters	XRANGE([start][.end]) returns valid characters between and including start and end.
D2X(wholenumber[,n]) returns a string which is the hexadecimal representation of the number.	SPACE(string[,n][,pad]) formats space delimited words in string with n pad characters between each word.	X2C(hex-string) converts a hex string to characters.
DATE(option) returns the date in choice of formats depending	STRIP(string[,option][,char]) returns a string with leading, and/or trailing spaces removed.	
	SUBSTR(string,n[,length[,pad]])	

SHAREWARE

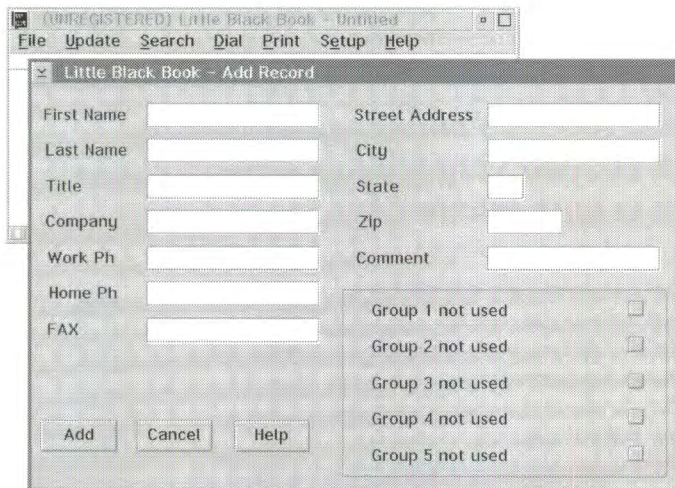
Steve Mathesius

“SHAREWARE? For OS/2? You’re kidding . . . right?” Wrong! The simple truth is that there is a lot of OS/2 shareware. A good portion of it is even good, quality software. The tough part is finding it. Unfortunately, OS/2 shareware doesn’t receive the attention or distribution of DOS or Windows shareware (not a big surprise there). Luckily OS/2 Monthly is here to help. In this column, I’ll bring you reviews of the latest, greatest, most-useful OS/2 shareware and freeware.

In this issue, I bring you eight of the most useful OS/2 programs available. Five of the programs are shareware, three are freeware.

Shareware is a simple concept: You get to try the program to see if it is useful. If you like it and/or use it, then you must register (pay for) it. If you don’t like it, then just stop using it.

Freeware is a slightly different concept. Like shareware, you are free to try out the program. But unlike shareware, you *never* have to pay for freeware! The author gives it to you to use for free. Now then, on to the programs!



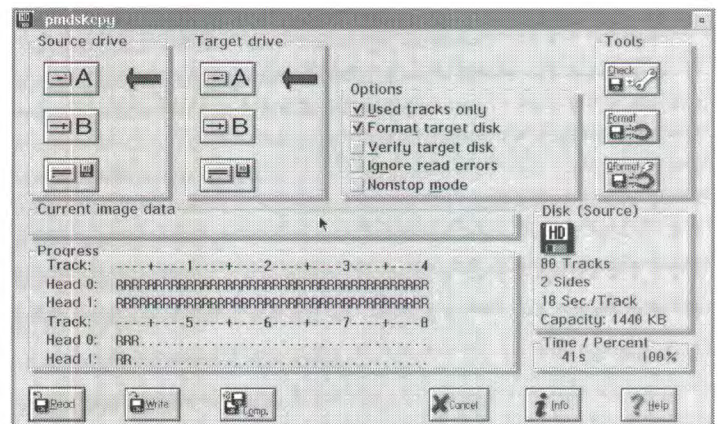
◆ LITTLE BLACK BOOK 1.1

Little Black Book is an OS/2 personal information manager that keeps track of names, addresses, phone numbers, and other useful information. It is very similar to its paperback namesake, but does even more. You can

have an unlimited number of books, and for each book up to five different groups of people (e.g., friends, family, business associates, restaurants, OS/2 shareware developers). Besides simply storing names and other information, Little Black Book can also dial the phone and print mailing labels. Little Black Book is easy to use and performs its job well, keeping track of just the information you need. It isn’t bloated down by unwanted or unnecessary features, and sports a simple but perfectly functional interface. Although this is a fairly new program, I only had one problem with it: it wouldn’t print labels correctly.

Overall, Little Black Book does one thing (i.e. manages personal information), and does it better than anything else.

Little Black Book 1.1 was developed by James E. Johnson, Jr., and costs \$40 to register.



◆ PM DISKCOPY 2.0E

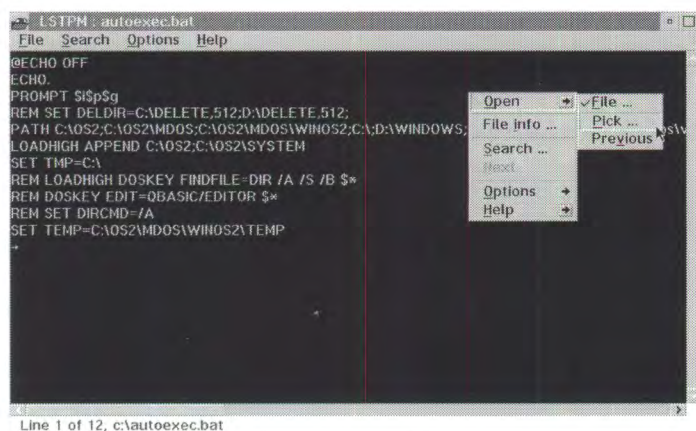
PM Diskcopy is the top-of-the-line disk copying program for OS/2. It makes full use of the presentation manager interface, making many options available with just one click of the mouse button.

PM Diskcopy can do more than just copy disks in one pass. It can format disks as it goes, make disk images on your hard disk (making multiple copies easy!), Quick Format disks, and much more.

Perhaps PM Diskcopy’s greatest feature is its ability to copy used tracks only. If you have only 100k on a disk

it reads only that 100k, not the whole disk. PM Diskcopy also has extensive on-line help.

PM Diskcopy 2.0 was developed by Bernd Wetzel, and costs \$25 to register.



● LstPM 1.05

LstPM is a PM file viewer that works well both from the command-line and from the OS/2 desktop. LstPM has the expected options: The ability to change the font, font size, and color, and to search the file being displayed for a given word. It also remembers the files you viewed, and can recall them quickly if you want to view them again. But don't misunderstand: LstPM can do much, much more.

If there is one program every OS/2 user should have, LstPM is it.

The developer of LstPM, Oberon Software, is marketing LstPM as freeware.

◆ LOOK2 2.1

LOOK2 combines the file viewing capabilities of List with simple file maintenance tools to provide a very handy character-mode program. When I switched to OS/2 two years ago, there just wasn't a replacement for PC/Computing's Directory Magic, but now LOOK2 is that replacement.

LOOK2 keeps a history of all the directories you have viewed. By pressing escape you can move back through the directories you were in. LOOK2 is best used from the command-line, where you can quickly execute LOOK2 to view a file. LOOK2 has mouse support, can view files in either text or hexadecimal mode, can delete non-empty directories, is HPFS-aware (supporting long file names), and more.

This version fixes some bugs contained in earlier versions, and is a 32-bit program.

LOOK2 was developed by Gary Bourque of Southwest Software, and costs \$25 to register.

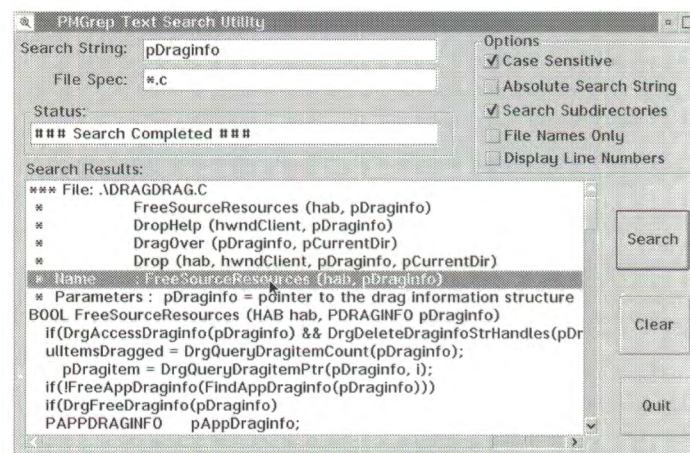
◆ MAHJONGG 1.1

Mahjongg has been around for centuries. There are DOS, Macintosh, Windows, and now, OS/2 versions available.

Due to the widespread appeal of the game, most people already know how to play. For those who don't know how to play, here's a quick run down: Mahjongg is a one-person game. The game is played with a set of 144 tiles, stacked in what is technically called a "dragon." The object is to remove all the tiles from the board by selecting matching pairs.

This is one of the few games for OS/2 that is fun to play time and again. Pairing up tiles might sound a little boring, but it is more challenging than you think. There is plenty of on-line help, but you probably won't need it. Mahjongg will also tell you how many tiles are remaining, and how many possible matches there are left.

Mahjongg was developed by SyncroSoft and costs \$20 to register.



● PM GREP 1.0

Unix users will be familiar with PM GREP, as GREP is a Unix command. On Unix, GREP is a command-line program, but PM GREP is a graphical, presentation manager program.

PM GREP searches for a text string across your hard disk, and reports back with the file name(s) and line(s) containing the text.

By selecting certain options before you start searching, PM GREP can do a case sensitive search, search

subdirectories, display line numbers, and much more.

PM GREP is very useful if you know what is in a file, but you can't remember where the file is, or what the file name is. Just search for the text, and PM GREP will tell you which file it's in.

PM GREP was developed by David J. Pagliughi, and the price is right: David has released PM GREP as freeware.

● LH/2 2.22

LH/2 is the OS/2 version of Lha, a file compressor/archiver for DOS. LH/2 compresses files into archives and automatically adds the extended attributes too. LH/2 archives typically take up 50 percent less space than the original files. It's very easy to use, with only one small screen of options, and includes all the fundamental features needed in a file compressor: Add, Extract, List, etc. However, it doesn't go overboard to try and impress you with how many features it has.

To sum up: LH/2 compresses files, does it efficiently, and does it easily.

LH/2 was developed by Peter Fitzsimmons of A:WARE and is freeware.

LinkRight by Rightware Inc.

The only file transfer system for OS/2.

LinkRight is a parallel port and serial port file transfer utility made especially for OS/2. The OS/2 versions are 32 bit, multi-threaded tasks. For a single low price, you can get a PM version, OS/2 command line version, and DOS version.

Copy files to/from OS/2 to/from DOS systems.

Files sent from OS/2 to DOS systems retain EAs. Although the DOS system cannot use EAs, if you copy files back to an OS/2 system, EAs will be transferred back to the OS/2 system.

Full multi-threaded application. The user interface portion is a separate thread from the file send and receive threads. Therefore, you can queue files while files are being sent.

Subdirectories, hidden, system files, and newer files can be selectively copied.

Extensive logging of significant events. The Event log contains a list of all successful and unsuccessful transfers. The Event logging facility can optionally be disabled. Event log can be viewed while transfers are in progress.

Error log is similar to Event log, except it logs errors only.

Batch file generation. You can mark and immediately send files, or you can mark files and save them to a list of files for later transfer.

Ability to select IDLE TIME TRANSFERS ONLY. File transfers occur at the lowest possible system priority, which allows you to edit files, run a spreadsheet, do word processing, etc., with virtually no impact to system response time.

Use both the serial port and the parallel port simultaneously (this feature not available in DOS version).

Features compression for faster transfers. Uses CRC checking to insure accurate transfers. Full support for long file names and HPFS.

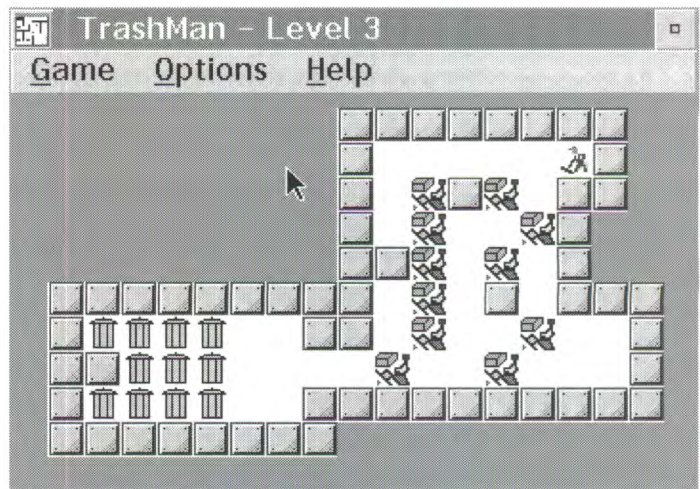
You can copy the OS/2 operating system from one system to another in accordance with your licensing agreement with IBM.

Compatible with LapLink cables.

For purchasing information call your favorite software distributor or Rightware Inc. (301) 762-1151.

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◆ TRASHMAN 1.2

It's a dirty job, but somebody has to do it. That's the reasoning behind Trashman. Trashman pits you, the intelligent sanitation engineer, against room after room of trash. Your job is to use your trusty pushbroom and push all the trash into the conveniently placed trashcans.

Don't be mistaken — trashman requires a great deal of thought. You can only push one pile of trash at a time, and there are walls placed to get in your way. There are many rooms to progress through, and your score is gauged by how many moves it takes you to clear a room of garbage. Let me warn you though: In the process of taking out the trash you may also be taking hours out of your day—Trashman can be very addictive!

Trashman was developed by CoralSoft and costs \$15 to register.



Well, that wraps it up for this month. If you are the developer of OS/2 shareware or freeware, please consider sending me a copy of your latest program so I can consider it for review in a future column.

If you're not a developer, send me your favorite shareware or freeware, and I'll check it out. You can get in touch with me through the magazine.

◆ Denotes SHAREWARE ● Denotes FREWARE

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Powerful Solutions brought to you by SPANS MAP Desktop Mapping Software

SPANS MAP is an easy-to-use desktop mapping software package that allows you to view and query geographically-referenced data in five simultaneous data formats: spreadsheet, map, chart, text and image.

SPANS MAP 1.1, the inaugural release which began shipping 18 months ago, has been readily adopted by the retail, finance, utility, environment and government sectors, to name a few. SPANS MAP 1.2, the latest release, is packaged with country-wide demographic and cartographic data, samples of electronic maps, an enlarged symbol set, and improved easy-to-use metafile support for high quality printing and plotting, and sells for only \$995.

Available for OS/2 2.0, and soon to be released for the WINDOWS environment, SPANS MAP requires 4 megabytes of RAM and a 30-megabyte hard drive. SPANS MAP can also access and use data from industry standard database management systems such as dBase, Lotus, Database Manager, and Oracle using SQL.

CONTACT: Patti Murphy, Communications Director, TYDAC Technologies Corp., (613) 226-5525, FAX:(613) 226-3819

BocaSoft Introduces OS/2 Screen Saver

Boca Raton—BocaSoft, the recent software start-up, headed by two former IBM software contractors, has introduced its second OS/2 product in as many months. Named BocaSoft WipeOut, the product is a 32-bit screen saver for OS/2, and features 14 animated screen saving displays. In addition, the program features password protection, integrated digital audio, customized message billboards and on-line help. Displays include bouncing balls, screen fades and rotates and icon hunters to name only a few.

WipeOut requires OS/2 2.0 or later (MMPM/21.0 or later required for digital audio) and about 2MB of disk space.

This pre-release program version will be upgraded free of charge when OS/2 2.1 is released. The special introductory price is just \$39. WipeOut and the company's

previous product, BocaSoft System Sounds for OS/2, are both available from Indelible Blue Inc. mail order catalog or can be ordered direct from BocaSoft, Boca Raton, Florida.

CONTACT: Heidi Getz, BocaSoft, (305)565-2917

Compatibility of ENVY/Developer and WindowBuilder

Object Technology International (OTI) and Objectshare Systems are pleased to announce a new version of WindowBuilder that is integrated with ENVY/Developer. The two companies will also cooperate to ensure that future releases of their respective products are compatible.

The new version of WindowBuilder will be available in the format of an ENVY/Developer library. Previous version of the two products required an integration effort by the customer before they could coexist in the same Smalltalk image. Customers will now be able to load and unload WindowBuilder into their Envy/Developer environment with no additional effort.

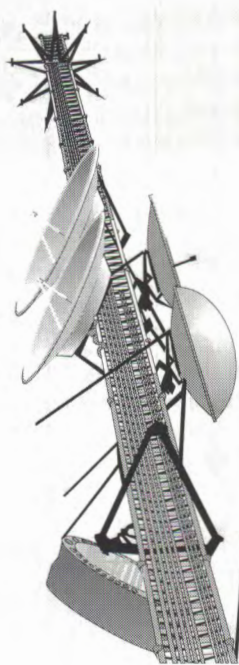
ENVY/Developer is an integrated multi-user environment for large scale Smalltalk development. It provides a highly productive team programming environment, which supports the prototyping, development, release and deployment of Smalltalk applications. The product's features include configuration management, version control, support for multi-platform development, performance profiling tools, a high-speed object storage and retrieval utility, and packaging tools for producing

standalone executables.

WindowBuilder is the leading Smalltalk product for building graphical user interfaces. Developers can quickly construct sophisticated user interfaces for their end-user applications. WindowBuilder is available for Digital's Smalltalk/V for Windows and Smalltalk/V for OS/2.

The new version of WindowBuilder for ENVY/Developer will be available from Objectshare. Contact Objectshare for specific pricing and product availability.

CONTACT: Ian Skerrett, Object Technology International, Inc., (613) 820-1200



32 SOMETHING!

LOTUS 123

Doug Azzarito



Welcome to the newest feature in *OS/2 Monthly*. Each issue, this column will look at the latest additions to the family of 32-bit applications for OS/2. Whenever possible, the new 32-bit versions of these programs will be compared to their 16-bit ancestors (either DOS or OS/2 based). These comparisons should give you a good idea of the benefits (and headaches) you will receive when you upgrade to the 32-bit version.

This month, we'll look at the new 32-bit version of one of the most popular programs of all time, Lotus 1-2-3. Lotus 1-2-3 for OS/2 2.0 is the first upgrade to the OS/2 version of 1-2-3 since the release of OS/2 2.0. Release 1.1 of 1-2-3 for OS/2 has been with us since September of 1991, and supports OS/2 versions of 1.2 and higher.

The documentation for 1-2-3 release 2.0 is nearly identical to the release 1.1 package, except in the way the manuals are bound. The User's Guide, Graph Tool and Solver manuals are bound together, as are the Reference and @functions/Macros manuals. The Setting Up and Quick Start manuals are also bound together, while the DataLens manual remains separate (DataLens allows 1-2-3 to communicate with Database Manager). The manuals are 7" x 9" soft-cover, perfect-bound books, which means you'll have to train them to lie flat. A glossy "SmartIcons" reference card is included, which gives an overview of the most visible new feature in release 2.0.

If a load of new features is what excites you about new software, 1-2-3 release 2.0 isn't much to look at.

The "New Features" section of the manual runs just over half a page, and the rest of the documentation is nearly a word-for-word copy of the 1.1 manuals. A "2.0" icon in the documentation alerts you whenever new features are discussed.

INSTALLATION:

The copy of 1-2-3 Release 2.0 reviewed came on five 3.5" HD diskettes. An additional HD diskette contained thirteen ATM fonts, and a 720 kB diskette contained the DataLens drivers. The installation procedure was a disappointment, and is nearly identical to the release 1.1 installation. I expected a PM-based, graphical install, but instead found myself watching the old full-screen installation procedure. Anyone who tries to get other work done while installing a new program will recognize the value of a PM-based installation. The Setting Up manual insists that the installation must be started from the command line, instead of using the Workplace Shell DRIVES

object to start the installation. As soon as the installation program starts, you are greeted with the warning, "You must install the Service Pack before using 1-2-3," although the installation will complete without the OS/2 2.0 ServicePak. The rest of the installation is uneventful and uninteresting, and can be completed in about eight minutes. While the Setting Up manual informs you that you'll have to manually create Workplace Shell objects for 1-2-3, the installation program asks if you'd like this done automatically. Several 1-2-3 templates are also created and placed in the Templates folder, and several 1-2-3 Data types are registered. Interestingly, the Workplace Shell program object created by installation is not associated with the 1-2-3 data types, but the 123G.EXE program file does have the proper associations, so direct manipulation of 1-2-3 data objects will start 1-2-3.

INSTALL will also modify the CONFIG.SYS and STARTUP.CMD files automatically. The changes are all described in the Setting Up manual. When everything is installed, you'll have bidden farewell to over 8 MB of disk space (over 1 MB more than was consumed by 1-2-3 release 1.1). You can also install the ATM fonts supplied on a separate disk, but not by following the instructions on the Adobe installation card (they're meant for OS/2 release 1.x). Getting thirteen free ATM fonts is nice, but trying to set up each font for use within 1-2-3 is a chore.

STARTING 1-2-3

Launching the new 1-2-3 takes even more time than launching previous

versions. On a 486/33 with 20 MB RAM (using OS/2 2.1 March beta), 1-2-3 Release 2.0 takes 24 seconds to load, compared with 14 seconds for 1-2-3 Release 1.1. The PM thread was unavailable for the entire time (therefore, a system-wide clock icon...so much for multi-tasking). After the wait, the 1-2-3 "desktop" with a blank worksheet appears, and 1-2-3 is ready for work. The first visible change in release 2.0 is the addition of "SmartIcons". These "shortcut" icons give you access to the most common 1-2-3 functions, and can be customized to suit your needs. There are 75 SmartIcons to choose from, but many are only available while you are manipulating a specific file type (worksheet, graph, preview, etc). You can assemble "sets" of SmartIcons, but the default sets are adequate. The SmartIcons can be attached to the side of the 1-2-3 "desktop," or they can "float" in their own window. Floating the SmartIcons allows you to use more than can fit along the edge of the "desktop." If you don't recognize the SmartIcon function from its picture, you can point at the SmartIcon and press the right mouse button to see a one-line description of its function.

Using 1-2-3 under the Workplace Shell metaphor is easier than the Quick Start manual implies, but there are still problems. You can drag a 1-2-3 worksheet file onto the 1-2-3 "desktop," and it will open, but only filenames with default extensions are recognized. Even if you assign a data type of "123 OS/2 sheet" to a file, 1-2-3 won't recognize it unless it has a .WG2 extension. HPFS long file names are supported by 1-2-3, but with data-types available, one wonders why we're still forced to use predefined filename extensions. Since file-extension associations are already set for 123G.EXE, you can start 1-2-3 by selecting any work-

sheet data file. 1-2-3 does not reject attempts to start multiple copies of itself, so you could really eat up system resources if you selected multiple spreadsheet files. Printing using the 1-2-3 and the Workplace Shell is a breeze. Any minimized worksheet or graph can be dragged from the 1-2-3 desktop to a Workplace Shell printer (note: only icons from the 1-2-3 desktop can be printed this way, not spreadsheet files on your OS/2 desktop). Automatic "adjust-to-page" sizing stretches graphs and spreadsheets to fill the page.

Still searching for something substantial to distinguish 1-2-3 release 2.0 from earlier versions, I pulled out my Comdex giveaway stopwatch (my thanks to Weitek for the useful trinket) and ran several benchmark comparisons. Worksheet load times were nearly identical to those of release 1.1, but worksheet saves were up to 20 percent faster in release 2.0. However, in the test that really counts (recalc speed), release 2.0 was consistently slower than release 1.1. My test worksheet, built to look much like a corporate balance sheet, took 5.6 seconds to recalc on 1-2-3 release 2.0, and only 3.8 seconds on release 1.1. I never came close to stretching the limits of what a 32-bit spreadsheet can do, but if Lotus meant to use 1-2-3 as an example of the performance benefits 32-bit code brings, they haven't sold me.

CONCLUSION

While you may not find performance gains in using 1-2-3 for OS/2 Release 2.0, the added benefits of Workplace Shell file manipulation and SmartIcons make this upgrade worth considering. The core functions of 1-2-3 are identical to those of earlier versions, which may give the product stability that wouldn't be found in a feature-packed new release. If you are currently using 1-2-3 for OS/2 re-

lease 1.1, spending a few minutes with SmartIcons and the new drag and drop ease may be enough to win you over. If you're currently living with a DOS or Windows based spreadsheet under OS/2 2.0, Lotus 1-2-3 for OS/2 release 2.0 will help you get the most from your system.

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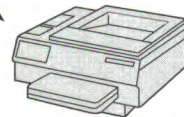
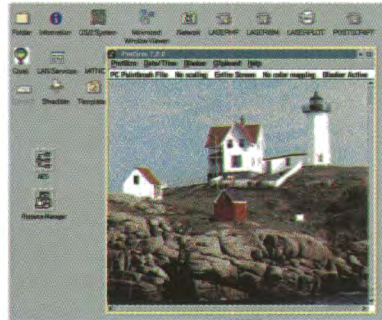
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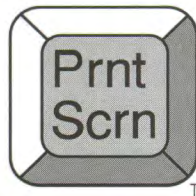


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OS/2 VERSION 2.1:

How The Best Gets Better

BY EDWARD S. HASICKA

As I write this, over 7,000 copies of OS/2 2.1 are being ordered via our 800 number every day. What makes this even more astounding is that the newest version of Boca Raton's 32-bit wonder is not even yet available. By the time you read this, not only will it be available, but you will be able to pick it up by phone, at your local PC software store, and on the PC you're thinking about purchasing from IBM and other hardware manufacturers. So why all the fuss about the newest OS/2?

There have been many new enhancements to OS/2 in version 2.1. In addition to the bug fixes one expects from a ".1" release, many new enhancements and functions have been added that will be discussed here:

- Higher performance WorkPlace Shell interface with additional *Drag and Drop* capabilities
- New, 32-bit Super VGA (SVGA) *seamless* display support
- Multimedia support for extensive audio recording/playback, motion video, CD Audio, MIDI, and WorkPlace Shell sounds
- WIN-OS/2 Version 3.1 standard- and enhanced-mode support for Windows applications
- Support for SCSI CD-ROM drives, additional printers, storage media, and pointing devices
- Advanced power management for mobile computers; PCMCIA enabled

The performance of OS/2 2.1 was increased significantly in many key

areas. The most obvious benefit to the end user will be noticed in the WorkPlace Shell (WPS), the graphical user interface. Under the covers, the graphics engine was rewritten from its earlier assembler incarnation via the IBM 32-bit C Set/2 compiler. Since this new 32-bit engine utilizes more memory, frequently used routines were fine-tuned and linked to condense the working set of instructions. This procedure, known as "page tuning," reduced the memory requirements and opened the door to a higher performance WPS — due in no small part to a talented WPS design team. This team of GUI mavens also provided additional functionality. For example, to change an object's icon, you can drag any object on top of the icon located on the General page of the object's Settings notebook. Or just drag the OS/2 *Windo* to that folder's pop-up menu. For easier identification, data file objects now display the icon of the program object to which they are associated (i.e. a WK1 file displays the Lotus 123 icon). Also, you can now use the Delete key to delete any object you select for faster object management. These slick features, a whole bunch of new bitmaps, and much more await you in the updated WorkPlace Shell.

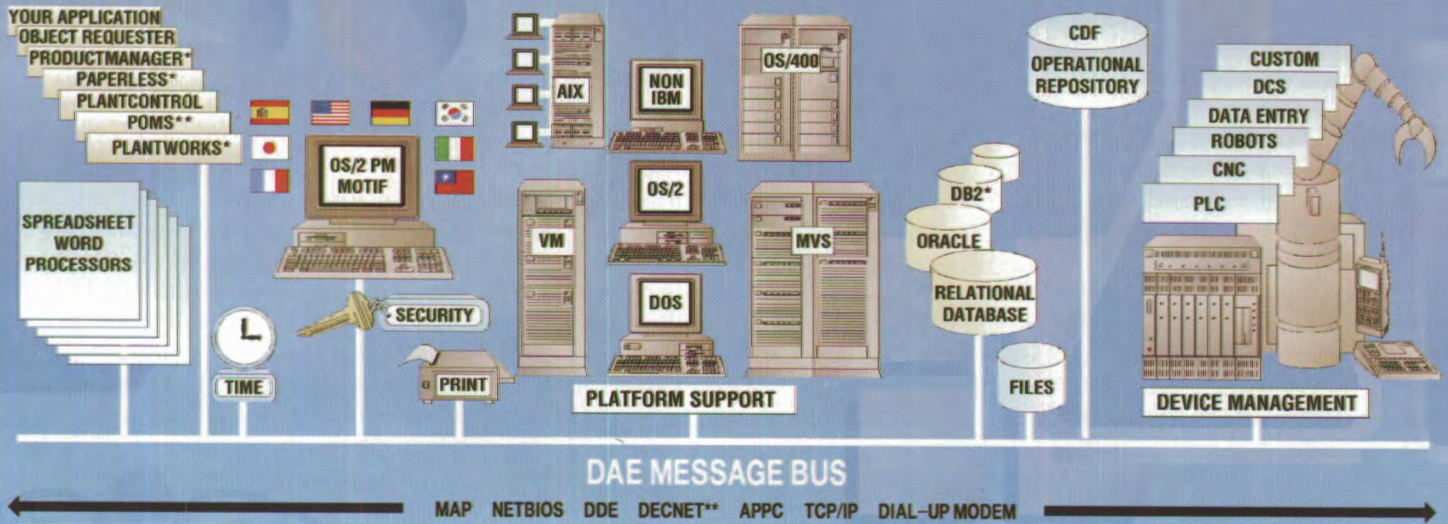
With the advent of an increasing base of visually-oriented applications, OS/2 2.1's 32-bit support of Video Graphics Array (VGA), Super VGA (SVGA), 8514 Adapter, and Extended Graphics Array (XGA) cards and displays is welcome by novices and power users alike. In addition to

page tuning for performance, the graphics engine provides a *palette manager* for shared color table support so that applications can change the color set on the fly when needed. For developers, new APIs were added for easier application development in a shorter period of time. This support is referred to as *seamless* since WIN-OS/2 3.1 (IBM's native Windows 3.1 support) applications can interact with OS/2 and DOS applications side by side in windows on the desktop. The driver actually *cuts a hole* in the OS/2 desktop to let a WIN-OS/2 program show through, allowing all applications to be manipulated in the same fashion. Drivers are provided for the following supported cards and chipsets:

- Video Graphics Array
- IBM 8514, XGA, XGA-II, and IBM VGA 256c (color notebook)
- ATI Technologies Inc. VGA Wonder XL (Rev 2.0 or higher)
- Headland Technology Inc. Video Seven, Chip HT209
- Trident Microsystems Chips TVGA 8900B/C
- Tseng Laboratories Chip ET4000
- Western Digital Corporation Paradise, Chips WD90C00/C11/C30/C31
- Cirrus Logic Inc. Chip CL-GD54 2X, Families 5422/24

After installing the operating system on an SVGA system, you run the **DSPINSTL** program (which automatically detects your adapter) to se-

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lect a higher resolution than the default VGA resolution. Video adapter manufacturers may supply drivers for OS/2 2.1 with their card as well.

Multimedia Presentation Manager/2

When you start getting familiar with the Multimedia Presentation Manager/2 (MMPM/2) that comes with OS/2 2.1, it will be music to your ears! We're not talking about just a few beeps and bells — this new MMPM/2 Version 1.1 is the *best* multimedia kit provided in any operating system you can get for your PC. If you have an IBM *M-Audio Capture and Playback Adapter*, any Creative Labs *Sound Blaster*, or the Media Vision *ProAudio Spectrum 16*, the WorkPlace Shell will sing and talk to you! Actually, the feature called **System Sounds** allows you to assign WAV file sounds to system events like dragging and dropping, opening and closing folders, or even shredding objects. (If you do not have an audio card, you can assign electronic tunes you create with the Tune Editor provided by OS/2 that play through your PC speaker.) That's just the beginning . . . you also get a Digital Audio application that lets you record, edit, and play back WAV audio files graphically. The Player/Recorder is well designed with easy-to-use controls to play and search through sound bites. Select Editor from the menu and the Player/Recorder transforms into a powerful audio editor, complete with a visual waveform representation of the file. Not only can you edit any or all of the audio clip, but you can change the speed and volume — even add echo, reverb, and fades. This dynamite editor even lets you mix audio files together into your own musical creations. Audio macros for OS/2 versions of Lotus 123 and Microsoft Excel create an *Audio* menu option to attach sound to spreadsheet cells which can be enhanced with the Edi-

tor. The Digital Audio program, and the MIDI player also provided, will keep your ears happy every time you power up your PC, opening the door to exciting multimedia applications and presentation tools.

The Compact Disc application lets you listen to your favorite albums off of your CD-ROM unit with an interface and features just like your home CD player. You can even store album titles that automatically appear the next time you listen to a given compact disc. Finally, the newest MMPM/2 addition is the Digital Video

product to record and edit movies will be available later this year as a separate product from IBM.) The movies are scalable so that they will automatically be played with less frames and colors on PCs that cannot handle the higher rates and resolutions. You can even start multiple video players at the same time (look at the README file in the *Multimedia* folder) to view both Ultimotion and Indeo AVI movies. From sound to video, this OS/2 exploitative suite of multimedia extensions turns your PC into an entertainment and educational resource.

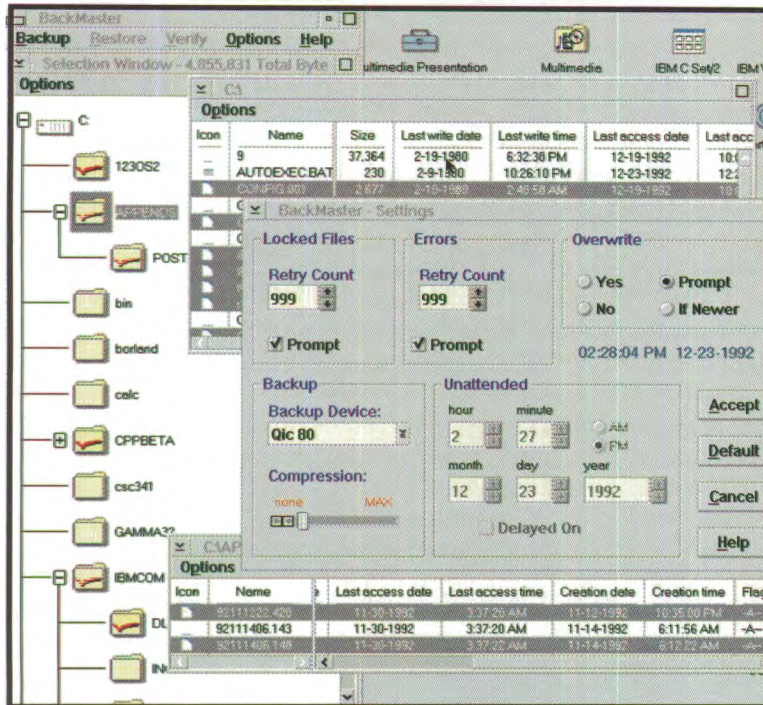
Probably the most anticipated feature for Microsoft Windows users is the new higher performance WIN-OS/2 3.1. Now you can run enhanced-mode applications in addition to the standard-mode applications supported in the previous release, and take advantage of Object-Linking and Imbedding (OLE) and Dynamic Data Exchange (DDE). Also provided are Adobe Type Manager 2.5, True Type support, and the major accessories like File Manager and Paintbrush, which, like any WIN-OS/2 program, can be executed in shared sessions or separate sessions; in full screen mode or seamless mode. Shared sessions run in a common WIN-OS/2 session while applications running in separate sessions are protected from session failure and are preemptively multitasked for better performance (two features not provided in a Microsoft Windows environment). You can use the Program Manager in a full screen session, akin to native Windows, or launch programs from WPS objects to run in a window on the OS/2 desktop. You can also install WIN-OS/2 support (a total of 8 MB for all features, with the option to install only selected features) on a drive other than where OS/2 resides. This way, the user gains added flexibility — especially those with small

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WIN-OS/2, and our superior DOS environment (which are part of OS/2 — you **do not** need to buy DOS and Windows separately) also benefit from a few additional features such as the ability to assign a different AUTOEXEC.BAT to each session, threaded DOS I/O, and DPMI 1.0 support. Via the Settings notebook, you can use **DOS_AUTOEXEC** to specify the name of a batch file to be executed as AUTOEXEC.BAT, allowing sessions which require different AUTOEXEC parameters to be easily managed. Intended primarily for multimedia and communications applications, the **INT_DURING_IO** option allows interrupts to be serviced via a second thread while I/O is performed on the primary thread. This allows DOS and WIN-OS/2 multimedia applications to perform more smoothly than in a native DOS environment. DOS Protect Mode Interface (DPMI) 1.0 support allows WIN-OS/2 and DOS DPMI applications to access memory without changing the Settings notebook for each program. A default of 64 MB is allocated and shared among sessions; only what is needed by each session is used, reducing the need for end user intervention. Altogether, the WIN-OS/2 and DOS support in OS/2 2.1 will entice even the most diehard DOS and Windows users.

Varied World of Hardware

The next issue tackled by 2.1 is the varied world of hardware. Whether you want to attach your Sony CD-ROM drive to your DELL PC, pick up the new Hewlett-Packard LaserJet 4 printer, add a Bernoulli drive or your favorite mouse, OS/2 2.1 will give you a hand. We have certified *over 750 personal computers from more than 114 manufacturers* to operate at a higher level with OS/2. In addition,

with so many people putting together their own PCs, we even certified individual components. If you have SCSI adapters from Adaptec, DPT, Future Domain or IBM, you are supported natively. Not only can you use a SCSI CD-ROM from IBM, Hitachi, NEC, Panasonic and others, but you can install OS/2 from them and take advantage of Kodak's Photo-CD Technology. If it's output you're after, just about any printer or plotter you can attach to your PC — over 260 of them — has been provided for right in the box, including the latest from Lexmark, Epson and Kyocera. Even the newest storage devices from Iomega and Quantum give OS/2 a place to save your programs and data. If you have a mouse or trackball from IBM (including the TrackPoint II), Kensington, Logitech, Microsoft or Mouse Systems, OS/2 lets you point in the right direction. If you want to see if your PC is supported, just dial into the IBM National Technical Support Center BBS at (404) 835-6600 and download the Personal Computer Manufacturer Table (PCMTABLE.ZIP).

With more and more people on the go, laptops and notebooks are becoming as common as briefcases. If you happen to be among the perpetually mobile, OS/2 2.1 is your travel companion. With Advanced Power Management (APM) support built into 2.1, your PC talks to OS/2 to make sure it uses power only when necessary. Components of your laptop or notebook can be disabled to conserve power when not in use, such as the processor, hard drive, display, and hardware ports. Monitor your battery easily with a graphical application that looks like a D-cell battery. Most portables, and some desktop PCs, are beginning to provide slots for PC Memory Card International Association (PCMCIA) adapters. These credit-card sized

adapters can come in the form of modems, LAN adapters, hard drives, and more. Conveniently, OS/2 supports *hot-pluggability* of these devices: the ability to add or remove adapters while the system is running without rebooting the PC. As applications emerge to embrace this popular standard, OS/2 2.1 will be ready and enabled to run them.

All in all, Operating System/2 Version 2.1 takes the *only* 32-bit Intel operating system you can buy to a new plateau. Whether it's faster graphics, multimedia, enhanced WIN-OS/2 support, or APM you're after, this is an upgrade with something for everyone. The new documentation is comprehensive and well written (complete with appendices containing *detailed* OS information) and the new CD-ROM version makes installation a snap. And yes, for those who just want a new game, we've provided Mahjongg Solitaire. It's a tile matching game that's multimedia enabled for hours of enjoyment. So what are you waiting for . . . pick up that phone and dial **(800) 3IBM-OS2** to get your copy today!

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OS/2 2.0 ADDs SCSI

The PC Industry and SCSI

BY THOMAS TEWELL

If you have been around the PC industry for very long you have undoubtedly heard about the Small Computer Systems Interface (SCSI, pronounced "scuzzy"). SCSI has promised great connectivity — to a wide variety of computer peripherals, such as fixed disks, tape drives, CD-ROM drives, optical drives and much more — to the mainstream PC marketplace. The problem, however, is one of SCSI controller board (known as a Host Bus Adapter or HBA) standardization. The major SCSI HBA manufacturers, such as Adaptec, Future Domain and DPT, all have SCSI HBAs that program at the hardware level much differently from one another. The invention of EISA and MicroChannel have also muddled the SCSI HBA programming waters somewhat. This lack of standardization has slowed down (but by no means stopped) SCSI's wide-spread acceptance in the PC market. Despite this, SCSI HBAs can already be found in a great many number of PCs, and several major computer manufacturers are adding SCSI as a motherboard resource to their next generation computer systems.

The reason for SCSI's pervasiveness is the incredible level of support from device manufacturers. There are literally thousands of different SCSI devices available on the market. In addition, many next generation computer peripherals, such as high-performance CD-ROM, optical drives, floptical drives, removable cartridge drives and digital tape drives, are available through SCSI only. I predict that SCSI will be on every new major computer system introduced within the next year or two.

The lack of programming standards at the HBA level, however, has challenged operating system developers' support of this powerful interface, thereby impeding its acceptance. Most major PC operating systems developed prior to 1991 had very poor SCSI support, if any. Today, most major operating systems have SCSI support under control. OS/2 2.0, Windows NT, Novell Netware and virtually all new flavors of UNIX have a comprehensive SCSI software solution built right into the operating

system. Microsoft has even informally announced that future versions of Windows and DOS will have built in SCSI support. It would appear, then, that the industry is rapidly moving in the SCSI direction.

Early OS/2 SCSI

OS/2 1.1 through 1.2 handled its fixed disks and floppy disks via all-encompassing device drivers called DISK01.SYS or DISK02.SYS depending upon whether the computer was AT class or PS/2 class. These device drivers were very complex and contained code that controlled the floppy disk and fixed disk subsystems directly. If a SCSI host adapter vendor wanted to support OS/2 he had to acquire the source code to DISK01.SYS or DISK02.SYS, modify it extensively and then gain a license to redistribute the modified code. This was a very lengthy and problematic procedure and many SCSI host bus adapter vendors simply did not do it, making OS/2 SCSI support very poor. In addition, after all this work, the modified DISK01.SYS and DISK02.SYS device drivers solved only the fixed disk and floppy disk problem; they did not solve the SCSI problem.

Microsoft LADDR For OS/2

Microsoft offered an improved SCSI solution for OS/2 1.21 and 1.3 called the Layered Device Driver Architecture (LADDR). This involved separating the device interfaces from the adapter interfaces. The device interfaces were called Type Specific Drivers (or TSDs) and were generic, regardless of which adapter was being used. The TSDs would pass requests on to the next layer, called the Vendor Specific Driver (or VSD), at which custom device handling could be done. Finally, the request would be passed on to the Bus Interface Driver (or BID), which would program the adapter and execute the request. Since Microsoft provided TSDs for disk, tape, CD-ROM, etc. as functional parts of OS/2, the burden on the SCSI HBA manufacturers for OS/2 was reduced to writing a BID. The only "gotcha" about the

LADDR interface was the load list. The load list was a file that could not easily be modified, specifying which TSDs, VSDs and BIDs should be loaded at boot time. The load list came from the operating system vendor and if a SCSI HBA manufacturer wanted your files to be included in it, it had to wait for a subsequent release of the operating system. Field software upgrades were therefore extremely difficult.

OS/2 2.0 SCSI

With OS/2 2.0, IBM decided not to use the DISK01.SYS, DISK02.SYS or LADDR architectures, although base line support for them is still provided. OS/2 2.0 was to have a layered device driver approach. These layers were to be called Device Managers, Adapter Device Drivers and Filter Adapter Device Drivers. These drivers would serve functions similar to those of the TSDs, VSDs and BIDs of LADDR. OS/2 2.0's SCSI support was to be quite powerful and was to allow for a wide variety of software developer product differentiation at multiple levels, while at the same time providing excellent base line compatibility "right out of the box." IBM's

base design model is shown in Figure 1. In this figure you will notice that the device drivers have extensions of .DMD (Device Managers) and .ADD (Adapter Device Drivers). Some of the other design requirements for the OS/2 2.0 SCSI solution are as follows:

- Support for full range SCSI.
- Support for the IBM SCB (Subsystem Control Block) architecture.
- Support for pre-existing fixed disk interfaces such as ST-506, ESDI, IDE and ABIOS.
- Support for floppy disks.
- Support for adapters that provide only ROM BIOS level disk support (no OS/2 2.0 device driver).
- Any combination of above the features.

Of Device Managers and ADDs

To achieve the above requirements, IBM designed a Device Manager (DMD)/Adapter Device Driver (ADD) approach. The Device Managers or DMDs are adapter-hardware independent and interface with OS/2 2.0 to provide three functions:

- Generic device support: disk, floppy, tape, etc.
- Installable file system support, such as ISO-9660 for CD-ROM or SO/IEC DIS 13346 for optical media.
- Support for other device driver-level programming interfaces, such as Advanced SCSI Programming Interface (ASPI) or Common Access Method (CAM).

The Adapter Device Drivers or ADDs, accept requests from DMDs or traditional device drivers and program the controller/host adapter to perform the requested task. This two stage approach allows the controller/host adapter manufacturer to simply be responsible for the small amount of software necessary to make its product work. This manufacturer therefore does not have to be concerned about broad based device support for OS/2, because several DMDs and installable file systems are already provided by IBM with OS/2 2.0.

By way of a practical example, OS2DASD.DMD is the fixed-disk and diskette Device Manager that provides generic fixed disk and diskette support for the OS/2 system. It acts as a standard fixed-disk and diskette driver for OS/2, and accepts requests from the OS/2 kernel and the High Performance File System (HPFS) IFS via the standard block device interface and the advanced

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strategy 2 interface. OS2DASD.DMD then formats these kernel requests into I/O Request Block (IORB) requests and passes them on to the appropriate Adapter Device Driver for final execution. ADDs do not need to know about fixed disks, floppy disks, cd-roms, tape drives, HPFS, IFS, ISO-9660 or any of these complex issues. ADDs only need to know how to accept an IORB request and execute it. The ADD interface is quite simple, yet at the same time very powerful and robust for the developer.

There can be many different Device Managers loaded in the system simultaneously. Device Managers can be written to support a class of devices (disk, tape, CD-ROM, etc.); or a Device Manager can itself be a programming interface that other device drivers can call—for example, the Advanced SCSI Programming Interface (ASPI) or Common Access Method (CAM), both very popular SCSI device driver programming standards (see Figure 2). In the case of a "translation" Device Manager, the Device manager would accept the request from a device driver, convert that request to an IORB request and pass it on to the designated Adapter Device Driver.

So, how do these Device Managers and ADDs get loaded into the OS/2 2.0 system? The answer is: via the CONFIG.SYS file. The initialization code of OS/2 2.0 parses the CONFIG.SYS file and loads device drivers with the following extensions in the following order:

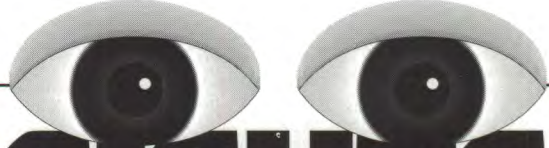
- .SYS (processed first)
- .BID
- .VSD
- .TSD
- .ADD
- .I13
- .DMD (processed last)

You will notice that all device drivers with the extension of .SYS are loaded and initialized first. This is in keeping with the original OS/2 1.x device driver loading convention. You will further notice that the LADDR driver loading conventions are then honored (BIDs loaded first, then VSDs, then TSDs). This allows users to use their functional LADDR drivers should they choose to do so. Next come the ADDs, the I13 ADD (which we will discuss a little later) and the DMDs. It is important to note here that IBM only supports the ADD/DMD interface with OS/2 2.0. The other files are loaded as a courtesy only. This is in keeping with backward com-

patibility. These drivers must be loaded with the keyword BASEDEV=, in the CONFIG.SYS file instead of the commonly known DEVICE=. A sample subsection of a OS/2 2.0 CONFIG.SYS file, might look like the following:

```
IFS=C:\OS2\HPFS.IFS /CACHE:64 /CRECL:4
.
.
.
BASEDEV=PRINT01.SYS
BASEDEV=IBM1FLPY.ADD
BASEDEV=IBM1S506.ADD
BASEDEV=OS2DASD.DMD
```

The IBM1FLPY.ADD controls the floppy controller, IBM1S506.ADD controls the fixed disk controller, and OS2DASD.DMD provides the generic device driver handling for the disk and floppy subsystem. If an Adaptec 1542 SCSI HBA were present with two fixed disks and a CD-ROM drive attached, along with a IDE fixed disk, the CONFIG.SYS file might look like this:



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```
IFS=C:\OS2\HPFS.IFS /CACHE:64 /CRECL:4  
IFS=C:\OS2\CDFS.IFS /Q  
DEVICE=C:\OS2\MDOS\VCDDROM.SYS
```

```
BASEDEV=PRINT01.SYS  
BASEDEV=IBM1FLPY.ADD  
BASEDEV=IBM1S506.ADD  
BASEDEV=AHA154X.ADD  
BASEDEV=OS2DASD.DMD  
BASEDEV=OS2CDROM.DMD
```

With OS/2 2.0, IBM currently ships the following ADDs:

```
IBM1FLPY.ADD  
ISA Floppy ADD IBM1S506.ADD  
ISA ST506 ADD IBM2FLPY.ADD  
ABIOS Floppy ADD IBM2ADSK.ADD  
ABIOS DASD ADD IBM2SCSI.ADD  
ABIOS SCB ADD IBMINT13.I13  
Generic INT 13H ADD AHA152X.ADD  
Adaptec AIC 6260  
Adaptec AHA 1510  
Adaptec AHA 152x AHA154X.ADD  
Adaptec AHA 154x AHA164X.ADD  
Adaptec AHA 1640 AHA174X.ADD  
Adaptec AHA 174x FD8XX.ADD  
Future Domain TMC-8xx FD16-700.ADD  
Future Domain TMC-16xx FD850IBM.ADD  
Future Domain TMC-850IBM FD7000EX.ADD  
Future Domain TMC-7000E
```

IBM has indicated that more and more ADDs will be made available for OS/2 2.0, whether by inclusion in updated OS/2 2.0 GA releases, from host adapter/controller manufacturers or via third party device driver development companies. In addition, IBM provides an electronic device-driver distribution mechanism via a bulletin board system (BBS). The number for the BBS is 1-404-835-6600. This bulletin board is called the National Support Center (NSC) BBS and is available 24 hours a day on a toll-call basis, with no access charge. The BBS requires a 1200 baud or higher modem supporting XMODEM file transfers, the modem set to 8 data bits, 1 stop bit and no parity. Updated device drivers, peer help and much more useful information can be found on this BBS.

Since IBM does not yet ship ADDs for every SCSI adapter and controller available for the PC with OS/2

2.0, yet, it has come up with a way that users can at least get OS/2 2.0 up and running on their SCSI systems without the necessity of having an ADD for their specific controller. To accomplish this, they relied on the use of the SCSI HBA's ROM BIOS to provide access to the fixed disks. The ADD called IBMINT13.I13 will check the system upon initialization and "see" if all the fixed disks have been claimed by other ADDs. If any fixed disks are left unclaimed, the IBMINT13.I13 ADD will attempt to manage these disks via the INT 13h ROM BIOS fixed disk interface. This is why the INT 13h ADD has a different extension than the other ADDs and is loaded last, via the BASEDEV= interface. It is mandatory for a SCSI HBA to have a ROM BIOS supporting INT 13h (and virtually all of them do) in order for this interface to work. In addition, it is important to note that this is only a fixed disk solution; it does not provide support for CD-ROM, tape, etc. Once the specific ADD is acquired for the controller, these other devices can be used.

Summary

The OS/2 2.0 Device Manager/Adapter Device Driver architecture will provide a long lasting and upgradeable device level interface for OS/2. Device level support is one of the most important elements in any major operating system. In many ways it can make or break an operating system. IBM decided to solve the problem once and for all with this interface, and as of right now it seems to do the job quite well. Many SCSI host adapter companies are developing ADDs for OS/2 2.0, and many computer manufacturers that are using SCSI as a motherboard resource are doing likewise. It is due to solutions like the DMDs and ADDs that OS/2 2.0 will likely be with us for years to come and will play a major role in the computer industry.

Thomas (Rick) Tewell is a programmer with many years of experience developing SCSI software. He is a principal of Sequoia Advanced Technologies, Inc., a firm specializing in SCSI software development and consulting. He can be reached on CompuServe at 71332,1020.

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ADVENTURES IN SCSI-LAND

Upgrading a Controller and Adding A CD-ROM Drive Under OS/2 2.0

BY JOHN G. FAUGHNAN

I've been a big fan of CD-ROMs from the first I heard of them. I know that an exponential decrease in the cost of duplicating and distributing large volumes of information has to have huge social and economic implications. The revolution has been slower than expected, though it's gaining disciples faster than the original printing press! Despite my enthusiasm I had put off my CD-ROM purchase in favor of more fundamental upgrades, but finally the IBM Professional Developers Kit (PDK) forced my hand. The amazing tools IBM's been distributing for a mere \$20 a pop are simply too tempting.

I researched my choices very carefully, relying heavily on the experience of expert users on the FidoNet 'OS/2 Technical' and 'OS/2 Hardware' echoes. There's no replacement for the personal experience of users. I'd already been burned once: in 1989 I purchased an Always IN/2000 SCSI controller because of promised support for SCSI devices and OS/2. It took over two years for DOS CD-ROM support to emerge, and only recently has Columbia Data Products provided OS/2 SCSI support. The cost of the required hardware upgrades, drivers, and 25 pin SCSI cable, combined with Always' failed promises and the unwillingness of Columbia Data Products to guarantee OS/2 2.1 support and upgrades, led me to an alternative SCSI solution.

I knew I wanted an integrated SCSI solution for my SCSI hard drives (Seagate ST296N 80 MB and Maxtor 7213SR 213 MB) and peripherals. OS/2 has delivered a rational approach to the SCSI peripheral interface for the Intel architecture; at last there's the potential to add peripherals to my OS/2 machine as simply as I add them to my Macintosh machines. Five months of FidoNet discussions established the Adaptec 1542c as the best choice for an Industry Standard Architecture (ISA) SCSI controller, and the Toshiba 3401 as the best choice for an external SCSI CD-ROM.

Adaptec co-authored the OS/2 .ADD standard for the interface between an SCSI controller and the host operating system. The drivers shipped with OS/2, and Adaptec controllers are widely used in OS/2 installa-

tions. The latest incarnation of the ISA bus mastering 154X line (the 1542c includes a diskette controller) adds software control of internal termination and various SCSI parameters; there's no need to mess with DIP switches. Along with Future Domain, Adaptec is a safe choice for future support and reliable operation. The 1542c's bus mastering minimizes the usual performance degradation experienced in multi-tasking environments. Bus mastering has been built into the AT bus since its conception; it brings a form of multi-processing to the humble PC.

There are disadvantages to choosing the 1542c. The ISA bus provides only 24 address lines for Direct Memory Access (DMA, needed for bus mastering), so physical system memory addressable by OS/2 is limited to 16 MB (virtual memory is still 512 MB per process). Programmed I/O (PIO) controllers such as the Future Domain and Always controllers can theoretically address all the memory that the motherboard will accept, though I was unable to use more than 16 MB with the Always. The ISA bus only allows one bus master; an Adaptec 1542c cannot be used with another bus master such as an XGA video card. Adaptec controllers have been reported to have problems with esoteric implementations of the SCSI-II spec, particularly on HP drives. Adaptec has a reputation for poor customer support, but they've added an 800 line (usually involving a 20-30 minute wait) and seem to be trying harder. Lastly, not all motherboards can support the timing constraints of bus mastering, particularly at accelerated bus speeds. Frankly, it's enough to make one yearn for widespread use of a 32-bit Micro-Channel (MCA) bus!

The Toshiba seemed a fairly safe choice; it was the only CD-ROM fully supported by the initial release of OS/2 2.0 and has been recommended by IBM all along. The Toshiba 3401 is SCSI-II compliant, has two SCSI rear connectors, supports the Kodak multi-session photo CD standard and XA levels 1 and 2, and is the latest speed champion with a 200 microsecond average access time and 330 kB/sec transfer rate. It comes with exter-

nal RCA jacks and a pushbutton SCSI ID selector. The 3401 meets IBM Ultimedia and Windows multimedia standards and works with a Macintosh. I'd heard reports from vendors of problems using the new Toshiba 3401 and the new Adaptec 1542c together under OS/2, but my FidoNet colleagues reassured me that despite their newness these products performed well. Once again the user reports were correct!

After much agonizing I made my choices. Happily, the prices on both the Adaptec 1542c and the Toshiba 3401 fell nicely during my time of decision. Now the real battle lay ahead! I'm going to run through my installation process point by point, hoping to spare you much of my suffering. Suffice it to say that everything worked at the end, but getting there was not half the fun!

The first phase of the struggle involved ordering the products. I found an Adaptec controller without drivers or cables from ComputAbility for \$200. You do not need any drivers to use this drive with OS/2 or with DOS/Windows within the OS/2 environment. If you want to use the controller with native DOS you'll have to buy a "kit," costing an additional \$50-100 depending on the variety of drivers included. The documentation is very sparse and barely adequate. An external Centronics DB50-50 SCSI cable costs \$20; it can be found elsewhere for \$15-20. The cable I received was six feet long, which is rather long since total length of the SCSI chain (including internal drive cables) must be under 6 meters. The shipping charge of \$11.00 was very reasonable, but ComputAbility offers NO returns, only replacement of defective units. *Caveat emptor!*

I took advantage of a special offer accompanying IBM's Professional Development Kit CD-ROM to purchase the CD Technology 3401 external drive, which is a repackaged Toshiba 3401. I paid \$500, though I've since seen prices as low as \$450. You also need an external terminator (\$15.00); Macintosh interface software is available for \$25.00. Shipping and handling was a relatively steep \$25. The CD Technology package comes with a large external power supply and a disk caddy, but no OS/2 documentation and no software. There's no on/off switch; the drive stays on at all times. Dire warnings of head damage resulting from power loss with a loaded disk are prominently displayed on the drive and the manual. With appropriate software (IBM MM/PM 1.0 or OS/2 2.1 beta) it's possible to listen to audio CDs through a front headphone jack.

I gathered up my diskettes from the initial OS/2 2.0 release and the service pack update, my OS/2 boot diskettes including TED.EXE and CHKDSK.EXE, and a working diskette containing PKZIP/PKUNZIP. I knew

from the FidoNet echoes that IBM had greatly improved CD-ROM support under OS/2 since the GA release, and that new drivers could be obtained from the IBM BBS or other fine OS/2 boards. I downloaded OS2CDROM.ZIP from the Fernwood BBS and reviewed the documentation. I wrote out every step of the planned operation, and updated and printed my system profile. Since OS/2 automatically gives each CD-ROM the next available drive letter I checked for conflicts with my DOS drive substitutions. I made sure I knew which ports, interrupts, SCSI IDs, and BIOS addresses my system used and looked for conflicts with the default settings for the Adaptec: IRQ11, DMA channel 5, SCSI ID 7, parity checking enabled, synchronization disabled, DMA transfer rate 5.0 MB/sec (this can be set higher at one's own risk). I recorded all serial numbers I could find on the Adaptec controller, and confirmed that the DIP switch settings matched those in the documentation. Those lucky souls who wish to install from a beta CD-ROM of OS/2 should prepare their boot diskettes and be sure they work. I was ready to begin.

Of course it didn't work out quite as I'd planned! A lot

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of my troubles arose because of a flaky Maxtor SCSI drive. I also learned that both the Seagate and Maxtor had to be low-level formatted despite rumors that this was unnecessary (it's not mentioned in the documentation, but Adaptec technical support confirmed my findings). As with a prior SCSI controller change they seemed to work well at first, but soon began to lose sectors. I'll outline here a more direct route than the one I took!

Since the 1542c was going to replace my Always IN/2000 hard drive controller I first backed up my data. I used Henk Kelder's freeware Workplace Shell (WPS) backup utility (WPTOOLS07.ZIP, Fernwood) to store a good portion of my desktop configuration. I was unable to get the InfoZip freeware OS/2 archiving utility to work with a large nested directory structure, so I used it simply to back up the folders where I store OS/2 files with associated long file names and extended attributes (EAs). I then used my DOS PKZIP 1.x (PKWare) archiver to archive all of my work and applications. I used OS/2 BACKUP to copy the archives to diskettes. This is a risky approach; one bad sector could mean total loss of the entire backup. Naturally, vital financial data were backed up separately as well. It's very frustrating that there is still no decent native OS/2 diskette backup utility. If you choose to use OS/2's BACKUP, remember that the RESTORE utility demands data in the same directory structure that you backed up from!

I then shut down my system and set to work. Swapping drive controllers is pretty straightforward, I did not have to change any of the Adaptec DIP switches. I knew that Adaptec's on-board BIOS utility would allow me to change internal SCSI termination as needed. I hooked up my internal SCSI hard drives and my two floppy drives, being very careful to keep the red edge of the cable aligned with pin 0 on the controller. Of course, my boot drive was set to SCSI ID 0, my second drive to ID 1, and the "end" drive was terminated. Parity should be enabled for all attached drives. The system PROM should be set for NO hard drives installed.

After checking all of my connections I rebooted and watched for the Adaptec prompt. At that point entering [less than]CTRL[greater than][less than]A[greater than] activated the Adaptec setup software. I successfully tested DMA transfer rates at the default speed setting of 5.7 MB. I then low level formatted both attached drives.

I then reinstalled OS/2, which I placed in its own 50 MB partition (I've installed in a 22 MB partition previously, but I had room to spare). I first installed OS/2 2.0 with CD-ROM support and all fonts and device drivers. Then I shut down and installed the service pack. Once again I cursed IBM's decision to release a 14-diskette

service pack rather than a complete set of updated OS/2 2.01 diskettes. I followed the directions for installing the updated CD-ROM support from the OS2CDROM.ZIP archive, being particularly careful to make the IFS and BASEDEV statements for the CD-ROM follow those for my hard drives and diskette drives. Then I shut down.

With the Toshiba 3401 and my PC turned off I connected the SCSI cable. I didn't have a terminator for the Toshiba so I had to defer that step. It worked anyway, but this is not wise! I left the Toshiba set to SCSI ID 4. I then rebooted and again activated the Adaptec configuration software by entering [less than]CTRL[greater than][less than]A[greater than] as directed. I disabled internal termination since the Adaptec was no longer the end of the SCSI chain.

Lastly, I restored my archives to the root directory of drive D and reconstructed my system settings using the Kelder utilities and a text file I keep to record my system revisions. OS/2 assigned the next available drive letter to my CD-ROM, but I found that to get the system to recognize the drive as other than an enormous diskette I had to boot with a CD-ROM in the drive. I later installed MM/PM 1.0 from the December Developer's Kit, and used the CD-Explorer applet to listen to audio CDs from the Toshiba drive.

I've since found the Adaptec controller minimally faster than the Always IN/2000 for most operations, while communications and background disk accessing are much smoother. The DOS and OS/2 CD-ROM applications that I've used have all worked very well. Software installations from CD-ROM are as blissful as I'd hoped. A very cheap two year old version of Grolier's encyclopedia is now at my fingertips; I can fake erudition with the best of them! Now I have to purchase my SCSI tape drive backup ...

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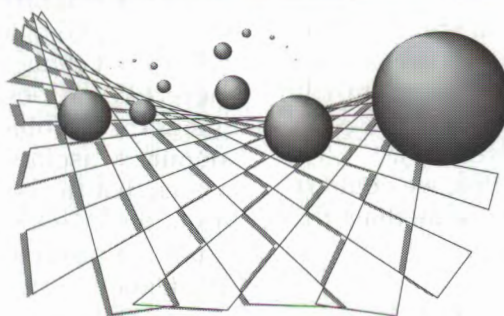
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OBJECT OBJECTIVE

KINGDOMS AND KEYS

David Moskowitz



Do we really need an object-oriented language? Certainly, a language that is specifically designed for object-oriented programming makes things easier. However, using an object-oriented environment or language doesn't provide any sure fire guarantees for success. As we've noted before, the real trick is not the language but the skill we develop with mental gymnastics as we master the art of object-oriented programming. Once we begin to master the ideas, we can apply them to any language.

If we don't use an object-oriented language, we need some way to compensate for the "missing" capability. In order to create an implementation methodology that allows us to take advantage of the concept without the specific language tools, we need to start with a basic understanding of the overall goals of object-oriented development. If we examine the object vocabulary, we can get some clues that allow us to proceed.

Starters

There are a couple of key ideas that we need to get started. The easiest is the concept of encapsulation. Object-oriented code encapsulates state variables and other important information within the definition of the object. The only way to access an object's data is through the methods associated with the object. In C, we can achieve some degree of data isolation if we pay attention to the language scope rules and scrupulously avoid the use of global data. This can take a bit of discipline, and the results (object-oriented program notwithstanding) are usually worth the effort in maintainable code. One of the many justifications for object-oriented development is the ability to reuse code.

Once we buy into the concept of data isolation, we still have a bit more work to do to be able to support the notion that each instance of a given object has separate data. In an OS/2 Presentation Manager application, each window is associated with a window class. The window class is a set of windows that shares the same window procedure. Each window of a given class differs from

other members of the class, based upon the data it processes.

This means we will also need a way to be able to isolate data specific to each instance of the window; we need a way to identify and separate the data associated with each window.

In an object-oriented language, we'd get the data for each instance from either a "pointer" to "self," or "this," or "me." If we limit our dis-

cussions to programs written for the OS/2 Presentation Manager, we can use the handle to the window (the first parameter to the window procedure — see the accompanying listings for examples) as the "self" pointer, and the WinSetWindowPtr (and WinQueryWindowPtr) Application Programming Interfaces (APIs). These APIs allow us to save and retrieve a pointer-to-window-specific data.

It might also help if we have a couple of macros that will make things look more object like (more about this a bit later).

As a first step, let's look at changes in coding style that will get us closer to object-oriented programming without an object-oriented language.

A Small Example

The code in listing 1 shows a sample skeleton of the start of a standard PM application. To keep things simple, the example is single threaded. However, the techniques can be applied equally well to multi-threaded applications. Using this as a base, we'll convert this to an object style that will begin to demonstrate two basic principles.

*SEE MAIN_NRM.C ON PAGE 55

Listing 1: Standard PM main routine

Principle 1: give the program the look and feel of an object-oriented program.

The first thing we do is make a couple of basic changes in the look and feel of the main routine (see

OBJECT OBJECTIVES

listing 2). We've changed the appearance to suggest the C++ new operator (instance = new something).

*SEE MAIN_OOP.C ON PAGE 55

Listing 2: OOP version of main

Most of the changes in listing 2 are cosmetic. However, it does help establish a mindset that can make things easier. We could also make the message pump (the while(WinGetMsg(...) WinDispatchMsg(...)) Loop with a Preprocessor Macro (an exercise).

If we wanted to be complete about this, we could replace the WinDestroyWindow, etc. with something that looked similar to the C++ delete operator.

Principle 2, place only function (method) calls in the switch statement.

*SEE WND._NRM.C ON PAGE 55

Listing 3: Standard WndProc

Listing 3 shows a bare bones standard WndProc. If you've

ever done any Presentation Manager programming, then you recognize the monolithic switch statement. If you've spent much time perusing Presentation Manager code, then you recognize the fact that this switch statement can sometimes go on forever! Other potential problems include the inappropriate use of global variables and unnecessarily complex logic to accomplish tasks.

The first thing we need to do is make the code look more like an object-oriented application. One of the things that an object approach does is provide a certain amount of isolation of various code-components. This means that the code to process messages gets removed from the switch statement. It also means that we separate the message processing code from the rest of the application — in a separate file (see Listing 4 for the resulting code, and Listing 5 for the macros used).

*SEE SND_OOP.C ON PAGE 55

Listing 4: OOP version of the WndProc

```
#define METHOD(name) MRESULT EXPENTRY name(HWND hwnd \, ULONG msg,
MPARAM mp1, MPARAM mp2)
#define METHOD_CALL(name) name(hwnd, msg, mp1, mp2)
```

Listing 5: Macros for OOP

With this approach, each of the "methods" is separate from the switch statement. Once we do that, we need a way for the method to retrieve "object-instance" data. As we've already mentioned, we can use the first parameter to every window procedure, the handle to the window (hwnd) as the equivalent to a "self" or "this" pointer. We allocate a memory block when we process the WM_CREATE message, then save the pointer to the block using the WinSaveWindowPtr. Each time we enter a method, we use the WinQueryWindowPtr provides access to window or control instance specific data.

With these changes, the switch statement becomes the "message router" it was supposed to be, as opposed to the home to most of the application processing. If you add a new message, then add the method to provide the service according to the suggested pattern.

What's Next?

What we've done thus far is change the coding style using basic concepts from object-oriented programming. We still need to define the data structure that holds "instance specific" data. What you place in the structure depends upon what you need. For example, you could put the resource ID, the current coordinates, "hot-options" information, etc. Give some thought as to what

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DAVID MOSKOWITZ

you want to place there. Furthermore, if you need to extend it later, you might also want to keep a record in the structure, about the current structure size. This makes it potentially possible to dynamically extend it, if needed.

To make the code more "object-like," we could place the methods into a DLL. As a part of window initialization, query the DLL to find out what messages it supports. Since there isn't a DosEnumProc API, we must write the function ourselves. However, the routine only has to enumerate the public messages the DLL processes, but does not have to enumerate the functions in the DLL.

With a bit more work, we could also create a way to override any supported method. To do that, we need a function to query the address of each supported method in the DLL (something similar to the WinQueryClassInfo API). We can override whatever methods we want, and then use the "parent" address to complete processing. Furthermore, there is no requirement that this code be exposed. We could actually bury the whole thing in a set of macros, to be consistent with an object-oriented language's look and feel.

What does this buy?

Object-oriented programming, in any language that is not exclusively object-oriented (e.g., Smalltalk), requires a bit of discipline to avoid the pitfall of standard procedural coding. The technique expressed here helps with some of the self discipline by helping us to focus on methods, encapsulation and isolation. On a per window basis, the Presentation Manager already provides a mechanism to handle polymorphism (the same message sent to many objects). With a bit of work, we can extend the technique to provide full inheritance and overriding (again, taking advantage of some of the facilities and models already provided in the Presentation Manager).

David Moskowitz is president of Productivity Solutions, 164 Avondale Road, Norristown PA 19403-2952. The consulting firm specializes in OS/2 and object-oriented development. He is the author of Converting Applications to OS/2, Brady Books, c 1989, and OS/2 2.1 Unleashed (with David Kerr), from SAMS Publishing c 1993.

David is a frequent speaker about OS/2 and object-oriented technology. He can be reached on CompuServe at 76701,100 and through the internet at 76701.100@compuserve.com.

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OS/2 Monthly • July 1993

FIRST LOOKS:

The Apps Are Comming, The Apps Are Comming!

Yes, folks, there are applications for OS/2, and starting with this issue I will be giving you a glimpse of what has come in. Please keep in mind that these are only capsule reviews. You can expect the full-fledged reviews in the near future.

Most recently, the postman brought me two packages from BocaSoft: System Sounds For OS/2, and Wipe Out. System Sounds for OS/2 provides the means to associate a sound with a PM, be it a system message (like opening a window, or pushing a button), or a user message. Imagine, if you will, a program that you use to buy and sell commodities. The programmer might tell the user what software signals are generated in the PM, making it easy for the user to associate an appropriate sound with the programmer's internal buy and sell messages. OS/2 2.1 allows the user to select sound for a select number of messages. This package adds unlimited flexibility to OS/2 2.1. You will need to install the multimedia extension to use this product.

Wipe Out is a screen saver. But that's not all. There is a hot key feature, as well as password protection and sound. The guys that created the products also worked on the MMPM/2. I was sold on this software before it got to my door. All of the screens are animated and configurable. One feature that I find interesting is the ability to start another program from the screen saver. For information on Wipe Out or System Sounds for OS/2, call BOCAsoft at (407) 392-7743 or **[Circle #1 the Reader service card.]**

Kill! Kill? A little gratuitous violence? No! This is one of the items on the command menu of the Bonami's CPU Monitor Plus. It is more than just a CPU monitor. It allows you to kill processes, change priority on processes, suspend or start processes. On screen, the user is able to view, by horizontal percentage bar graph, the CPU utilization. If you don't like the fonts on the graphs you can always change them. The program is completely configurable. From BonAmi Software Corporation, 60 Thoreau Street, Suite 219, Concord, MA 01742, (508) 371-1997

[Circle #2 the Reader service card.]

In my spare time, I happen to enjoy programming. With all in mind, nothing beats a hard listing for documentation and debugging purposes. Flextext provides

the user a means to print files in a variety of ways. After passing the text file to the program you can choose to print the file, one page or two pages per sheet, single-sided or simulated duplex. Since the program utilizes the ATM fonts, you can print your files in varying font types and sizes. From Extension Software, 921 W. Meseto Ave, Mesa AZ 85210 (602) 820-0321. **[Circle #3 the Reader service card.]**

Hocus Focus and Desktop Observatory are two products by Pinnacle Technologies. Both of the programs will capture any open object during its capture interval or from a list of specific objects you wish to manage. It will then place it into the Icon window in the first possible position. It provides a single click selection for your active objects. Any object can be password protected in the Desktop Observatory version. The security feature even works across a LAN. If OS/2 security is an issue, or your desktop real estate is running at a premium, these programs are for you. From Pinnacle Technology, P.O. Box 128, Kirklin IN 46050-0128. **[Circle #4 the Reader service card.]**

LinkRight by Rightware Inc. is a parallel port and serial port file transfer utility made especially for OS/2. The package includes a PM version, an OS/2 version and a DOS version. The OS/2 versions are 32-bit, multi-threaded tasks. Laplink, move over! This product features compression, uses CRC checking to insure accurate transfers, and provides full support for long file names and HPFS. It gives you the ability to retain those all-important EAs and long file names during transfer to or from OS/2 and to or from DOS systems. It also provides event logging and a score of other features. Watch for the review. Rightware Inc., 15505 Villisca Terrace, Rockville, MD, 20855, (301) 762-1151, FAX (301) 762-1185.

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For those of who need to get in touch with us electronically, try section 4 on the new OS/2 vendors forum to Compuserve. Type Go OS2AVEN at any prompt. If you would like to send us private email, the magazine's Compuserve ID is 71333,2632. Our internet ID is 71333.2632 @compuserve.com. We also frequent the Shareware BBS (703)385-8450, address posted mail to me. Our fidonet address is 1:109/357@fidonet.org. Our GENIE address is JOELSIR.

PRODUCT REVIEWS

ICONEASE & INTERCEPT

✓IconEase

Ever since the early beta versions of OS/2 2.0 users have been uneasy about the number of steps it takes to change the icon associated with a program object. Dave Lester, the author of WPSBackup, has created a shareware utility to address this issue. The utility is named IconEase to indicate the intent of the utility.

IconEase utilizes the notebook metaphor introduced in OS/2 2.0 to present the icon database to the user. The icon database itself is stored in compressed format. When invoked the IconEase program presents the user with a three-inch wide by four-inch high notebook. At first you might think that this is awfully small but in reality it is just the right size. By choosing this size, the amount of screen real estate used is kept to a minimum while maintaining readability.

The notebook page contains a list box which allows the user to scroll through the names of the icons beginning with the letter that appears on the notebook tab (see figure 1). Once the user locates the desired icon within the list box, he double clicks on the file name and the icon appears at the top of the notebook page.

Once the desired icon has been chosen, the user has three options. Two of the options are invoked by clicking on buttons located at the bottom of the notebook page and the third option is invoked via drag-and-drop.

If the user clicks on the EDIT button at the bottom of the notebook page, the OS/2 icon editor will be invoked with the selected icon displayed within the edit window of the icon editor. At this point the user has all the capabilities of the OS/2 icon editor at his disposal.

If the user clicks on the CLIPBOARD button at the bottom of the notebook page the selected icon is copied to the clipboard.

The drag-and-drop function allows the user to drag the selected icon from the top of the IconEase notebook page and drop it onto the desktop or any folder on the desktop. If the user is using OS/2 2.1 he may drag the de-

sired icon from the IconEase notebook page and drop it directly onto the general page of the settings notebook for a program object. The ability to drop an icon directly onto the general page was not implemented until the March beta of OS/2 2.1. As a result this option is not available to OS/2 2.0 users. If the OS/2 2.0 user tries to drop the icon on the general page he will be presented with the standard OS/2 2.x black circle with a white bar indicating that the action is not allowed.

Within OS/2 2.1 the procedure for changing a program object icon using IconEase is as follows:

1. Click the right mouse (RMB) on the program object whose icon you wish to change.
2. Click on the arrow next to the Open menu option.
3. Click on settings
4. Click on the General tab.
5. Invoke IconEase
6. Select the notebook tab corresponding to the first letter of the desired icons name
7. Double click on the name of the desired icon.
8. Drag the desired icon from the top of the IconEase notebook and drop it on the OS/2 desktop.
9. Drag the icon from the desktop and drop it on top of the icon on the general page of the settings notebook.
10. Close IconEase and close the program object by double-clicking on the window button in the upper left corner of each window.

A few more steps are required for OS/2 2.0 users (as opposed to OS/2 2.1). OS/2 2.0 users will need to do the following:

1. Follow steps 1 through 4 above.
2. Click on the edit button on the General page (invokes the Icon Editor)
3. Select the desired icon using steps 5 through 7 above
4. Click on the CLIPBOARD button on the bottom of IconEase notebook

5. Click on the Icon Editor title bar and then press Shift-Ins
6. Perform step number 10 above.

At first look you might not see the advantages of using IconEase over the OS/2 WPS method of changing the icon associated with a program object. There are several advantages such as speed, ease of selection and greatly reduced harddrive space.

The speed advantage is definitely noticeable. Anyone who has had to wait for the icons within a directory to be displayed can appreciate what I am talking about. The notebook metaphor allows the user to "zero" in on only the icons beginning with the same letter as the desired icon by simply clicking on a notebook tab. Once the correct tab has been chosen the user simply scrolls through the list box and double clicks on the desired icon.

The disk space savings are huge. In order to understand why the savings are so great you must first understand how files are stored on the hard drive under the FAT and HPFS file structures.

The FAT method of storing files allocates file space in

2K or 4K chunks depending on whether or not the disk partition is less than 127 Mb (2K) or greater than 127 Mb (4K). This means that if you wish to store 3300 icons within a FAT partition you would require either 6,758,400 or 13,516,800 bytes to store the icons as opposed to 2,930,400 ($888 * 3300$) as many people believe.

The HPFS method of storing files allocates file space in allocation units of 512 bytes each. Each icon would take 1024 bytes for a total of 3,379,200.

The IconEase database of icons is stored in 942,697 bytes. If you compare the numbers you can see how much harddrive space IconEase saves. It will save you between 2,436,521 and 12,574,103 bytes of hard drive space. It should be noted that Novell allocates space in 4K allocation units so the savings on the LAN would be 12,574,103 bytes.

The unregistered shareware version of IconEase comes with 100 icons in the database. IconEase can be downloaded from library four of the OS2USER forum on Compuserve. The file name is ICONES.ZIP. IconEase can also be downloaded from many other BBS locations.

The registered version of IconEase comes in a few varieties. The user can get either the 100 icon database version or the 3300 icon database version. Users who purchase the 3300 icon version can get an 8.5" by 11" spiral bound book containing black and white pictures of all the icons in the database. The author also is making the utility used to create the icon database available for an extra fee. Currently the database creation utility only works on HPFS volumes but the author is working on changing the utility to also work on FAT volumes. The HPFS limitation applies only to the database creation utility and NOT IconEase itself.

INFO

Site licensing is very attractive at only \$250 for an unlimited number of users.

The registration fees for IconEase are as follows:

100 Icon Version \$15

3300 Icon Version \$25

3300 Icon Version with book \$40

Database Creation Utility \$20 Site License \$250

Dave Lester, the author of IconEase can be reached on Compuserve (75600,237) or by writing to the following address:

Dave Lester, New Freedom Data Center, Box 461
New Freedom, PA 17349



Proportional Software Corporation
1717 Linden Lake Road - Fort Collins, CO 80524 - Sales Hotline: (303) 484 2665 - Fax: (303) 484 2670

Circle #10 on Reader Service card

✓INTERCEPT

Have you ever experienced the following scenario? You click on the right mouse button to surface the desktop context (pop-up) menu. The menu does not appear as quickly as you feel it should so you click on the right mouse button again. As a result you encounter two actions unfolding in front of you, one of which is desired and another which makes you cry. The desired action is the appearance of the desktop context menu while the undesired result is the total rearrangement of your customized desktop. The reason this happens is because the user moved the mouse slightly upward from the location where the right mouse button was clicked to invoke the desktop context menu. As a result the second click of the right mouse button actually invokes the arrange menu choice which is at the bottom of the desktop menu.

Apparently you are not alone since this problem is what led Donna Campanella to create INTERCEPT. INTERCEPT is a utility which is invoked by placing it in the startup folder which allows the user to specify that he/she be warned prior to execution of an arrange and/or lockup function.

The configuration of the utility is accomplished through the use of one dialog box (see Figure 1). The user may choose whether or not the arrange function is to be intercepted or not. If the user chooses to have the arrange function intercepted, he may select whether he wants to have the arrange function intercepted for just the desktop or for the desktop and all other folders.

In addition, the user may choose the prompt option. If the prompt option is not selected, the arrange function will be unconditionally intercepted for the desktop and/or all folders. If the user selects the prompt option he will be prompted when ever an arrange function is executed. When the prompt dialog box appears, the user has the choice of defeating the arrangement request or allowing the arrange option to take place.

The user may also select to have visual and/or audio confirmation that the arrange function was intercepted. The audio confirmation is a series of beeps while the visual confirmation is a dialog box that is displayed indicating that the arrange was intercepted. The dialog box contains an OK button which the user selects to dismiss the dialog box.

The same series of options is provided for the lockup function. INTERCEPT can also be configured to start minimized. This option is very helpful in making the utility transparent to the user until either a lockup or arrange function request is intercepted. I would suggest that the utility be placed in the startup folder with the

start minimized check box selected.

I have tested this utility under OS/2 2.0, and the OS/2 2.1 beta (6.479 and 6.498). Testing was done on a workstation connected to a Novell 3.11 LAN via the Novell Requester (PS/2 Model 77 and PS/2 Model 95) as well as a stand-alone Northgate Elegance 386/33. I encountered no problems whatsoever with the arrange utility. I would strongly recommend the utility to anyone who has been frustrated by having their OS/2 2.x desktop unintentionally rearranged.

The INTERCEPT is a shareware utility which can be downloaded from library four within the OS2USER forum on Compuserve. The name of the file is INTERC.ZIP. The registration fee for the utility is \$20. The utility is probably available from other BBS locations also. If you are unable to download the utility you may also contact the author at the following address:

Donna Campanella, 508 Natalie Lane, Morris-town, PA 19401

Donna's Compuserve ID is 72010,2305 and her Prodigy ID is KCTW07A.

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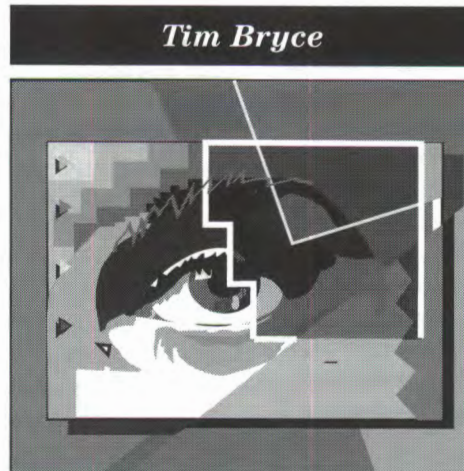
MIGRATING WINDOWS

Back in the 1980's the management consulting firm of A.T. Kearney & Company in Chicago produced an interesting research paper entitled, "Managing the Information Agent — How Effective Are We?" The purpose of the paper was to study how effectively U.S. companies were managing their information resources and whether there was a correlation between Information Resource Management (IRM) and financial performance.

The research sample consisted of companies in a variety of industries. The results were based on extensive interviews with 40 of the nation's most successful corporations. Perhaps the most startling revelation from the study was that only eight percent of the companies surveyed had formal business plans to organize and manage information resources. This eight percent group financially outperformed the rest of the companies in the study by a whopping 300 percent in terms of return on equity, return on total capital and net profit margins over a five year period.

There have been subsequent studies performed by various consulting companies since the A.T. Kearney report was produced, all arriving at the same conclusion: there are some bona fide benefits to managing information resources.

Why, then, now in the 1990's, have few companies adopted a corporate IRM policy? Probably for the same reason as that spelled out in the A.T. Kearney study: executive management feels uncomfortable with managing information resources. And maybe the reason executive management doesn't understand IRM is that we, as system professionals, do not understand it ourselves. Consequent-



ly, we cannot solicit support from management for a seemingly nebulous concept. Before we can legitimize it, we must first understand it.

Although there have been volumes written about Information Resource Management, it remains a subject shrouded in confusion. There are probably as many interpretations of IRM as there are people who tout its virtues. And wherever inconsistencies occur, confusion is sure to follow. There are those people who see IRM as nothing more than records management. Others simply regard it as managing data resources, or merely managing information-related technologies (e.g., computers, networks, office automation).

Perhaps the best way to think of IRM is as a way to design, develop and control ALL of the resources required to produce information. This would include three classes of information resources:

BUSINESS RESOURCES — representing the parts of the business requiring information or involved in the processing of data. These resources include enterprises, business functions, jobs/positions, human/machine re-

sources, skills, business objectives, and projects.

SYSTEM RESOURCES — representing the necessary processing components. This includes information systems, subsystems (business processes), administrative procedures, operational steps, computer procedures, programs, modules and subroutines.

DATA RESOURCES — representing the data needed to produce information. Included are data elements, storage records, computer files, manual files, input transactions, screen panels, print maps, inputs, outputs, logical files (objects), logical records (views), and data bases.

Control over these resources permits the manipulation of the resources to produce different forms of information. When standardized and controlled, these resources can be shared and reused by the whole corporation, not just by a single user or application. Sharing and reusability are the conceptual underpinnings of IRM. Companies can realize considerable leverage from this alone. It accelerates the development process by reusing existing resources, and it promotes systems integration and data integrity through shared parts.

The IRM concept of standardizing and reusing parts is actually derived from the discipline of Materials Resource Planning (MRP) as found in manufacturing. MRP is the process by which all materials, raw or manufactured, are catalogued and cross-referenced to products, assemblies, subassemblies and other parts. Consequently, different products can be easily assembled and inventories effectively controlled.

Perhaps the biggest reason why executives grasp the significance of MRP better than IRM is that MRP

represents tangible items that can be touched and felt. Information and its resources are considerably less tangible and difficult for executives to assimilate. And herein lies the problem. Executives will not support IRM if they cannot appreciate the need for it.

A single product may consist of hundreds or thousands of components. Similarly, a single information system will consist of hundreds or thousands of resources. In fact, a recent MBA study revealed that there are over 2,000 resources in the average information system, most of which are suitable for use in other applications. Trying to manage these resources without some form of standardized and consistent approach will only produce disjointed results and the opportunity to share and reuse resources will be lost. Since we wouldn't ask engineering and manufacturing personnel to work this way, why should our systems development organizations be any different?

Although there are some short-term benefits associated with IRM, the real benefits are long-term in nature. Sharing and reusing resources is an evolutionary process. Resources must be carefully designed and standardized before they can be reused. Consequently, IRM requires executive visionaries with an eye on the future. It cannot be adequately supported by managers who are on the corporate fast-track and apply superficial remedies to solving problems.

IRM is not a particular tool or technique. Rather, it is a management philosophy that seeks to capitalize on the corporate resources needed to produce information. In order for it to succeed, a company must openly state its position on IRM to its employees, and adopt methods to implement it. Arguing over the mechanics of IRM without first adopting a corporate policy on IRM is like rearranging the deck chairs on the *Titanic* as it is sinking.

Bottom-line, IRM is based on the belief that information resources can be developed and managed like any other corporate resource (e.g., materials, human resources, equipment, financial resources). It does not require any new theories of management. In fact, the management concepts have been with us all along, such as those found in MRP. The only difference is that we are dealing with a much less tangible resource than we are used to. As the A.T. Kearney study indicates, the benefits can be substantial, particularly from an economic perspective. Documenting information resources has one last important by-product: the ability to map and model the enterprise, including all of its systems and data resources, or as we like to say — "IRM is the view of the enterprise from 50,000 feet."

— BRYCE'S LAW

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THE ULTIMATE OS/2 GAME

A TURN FOR THE BETTER

This issue marks the seventh installment of my column — it's the perfect time to get some perspective on how far we've come.

This column has two purposes. The first is to teach OS/2 2.x PM programming, mainly by example. The second is to develop the ultimate game for OS/2. All of the OS/2 games I have seen so far are rather simple — they barely take advantage of any of the features that OS/2 has over DOS.

The Ultimate OS/2 Game is a variation of the BattleTech and MechWarrior from Fasa. BattleTech is a board game based upon combat among large humanoid tanks called BattleMechs, and MechWarrior is its role-playing counterpart. I have permission from Fasa to use their trademarks with two provisos: the copyright must be shared between Fasa and myself, and the game must be distributed free of charge.

Although this game has been in development for over a year, it is still in its infancy. Construction of a functional combat system is the first goal. The combat system is composed of four subsystems: terrain editing, movement, weapons control, and damage control. At this point, the first three are partially completed.

The terrain editor allows the player to create or alter a combat field which is organized into a hexagonal grid. Each hexagon represents an area thirty meters in diameter. The current implementation allows the player to select from eleven different terrain types.

The movement subsystem controls the navigation of all the 'Mechs on the playing field, whether they are piloted by the player or by the computer. It keeps track of game time, it determines initiative (a role-playing term that describes who goes first in a given turn), and it regulates movement points.

The weapons control subsystem handles all the details of firing a weapon. It decides what targets are visible, which weapons are available, and whether the shot was successful. It knows all the stats of each weapon and attack type.

The damage subsystem determines the effect of any attack, and it keeps track of each BattleMech's condi-

tion. It knows what is damaged, how long it will take to repair the damage, and how much the repair will cost.

Once these four are fully implemented, then the first half of this project will be completed. A discussion of the second half, the role-playing MechWarrior, will be saved for a later date.

The text from the first installment of this column (volume 1, number 3) is now available electronically, for those of you who are interested in getting a better picture of what this game is all about. Look for it wherever "OS/2 Monthly" archives are available.

The compiler options have been changed to use the single-threaded library. It is possible for a multi-threaded program to function correctly with this library. The trick is to ensure that only one thread calls the run-time library at any given time. The function which handles hexagon highlighting during targeting, `Highlight()` in module `TARGET`, does not contain any library calls. Therefore, the multi-threaded library is not necessary.

ERRORS

As the complexity of a piece of software increases, so will its error handling capabilities. Unfortunately, most languages have poor syntactical support for error handling, and C is no exception. I am not going to present a detailed analysis of error handling, since that topic deserves far more attention than I can give it.

There are two errors handled by this program. API errors, such as the failure to create a presentation space via `GpiCreatePS()`, are unrecoverable and force the program to terminate immediately, sometimes with a message box appearing. I have never experienced such an error, and I doubt that I ever will. Nevertheless, errors are almost exclusively caused by invalid parameters and need to be checked.

The other condition is a user error, such as attempting to load a map that does not exist. For these errors, a message box always appears, informing the user of his mistake. The operation is usually cancelled automatically, and the program continues without a hitch.

Error messages are of type `ERROR`, an unsigned 32-

bit integer that uniquely describes the location where the error occurred. Function `ErrorBox()` takes an error code and displays a message box that shows the module name, the function name, and the error message. The names and messages are stored in file `ERRORMSG.H` in look-up array `amsg[]`.

Function `ErrorBox()` displays an error message box. Using the information in the error code, it knows to which module and function the error belongs.

For example, take the error code `ERR_BITMAP_LOAD_HBM` (`0x01020300`). This error occurs when the bitmap ID passed to function `BitmapLoad()` is invalid. A bitwise-AND with `0xFF000000` results in `ERR_BITMAP` (`0x01000000`), and another AND with `0xFFFF0000` gives `ERR_BITMAP_LOAD` (`0x01020000`). The look-up array translates these values to "BITMAP" and "BitmapLoad," respectively. This is how `ErrorBox()` knows the module and function names.

At this point, you might be wondering why the error messages are not stored as string resources. The reason is quite simple: the resource compiler that comes with the OS/2 2.0 toolkit does not accept `ERRORS.H` because

it contains arithmetic expressions for some of its definitions. Until an improved resource compiler can be found, the error messages stay where they are.

BITMAP

The first thing you will notice is that `BitmapShutdown()` will only perform a shutdown if needed. Then it resets all the handles (`hdcMemory`, etc.) so that the module can be reinitialized. This feature is not used, but it is good programming practice. If the shutdown procedure fails, then the appropriate error code is returned.

All of the bitmaps are stored in a single memory presentation space. When a particular bitmap needs to be drawn, it must first be selected, and then copied from that PS to the screen PS. `GpiSetBitmap()` is used to select the bitmap, and `GpiBitBlt()` then draws it on the screen.

For reasons unknown to me, `GpiSetBitmap()` returns an error if the desired bitmap is already selected. Just to make sure that this "error condition" does not cause any problems, the variable `hbmCurrent` has been added to keep track of the currently selected bitmap.



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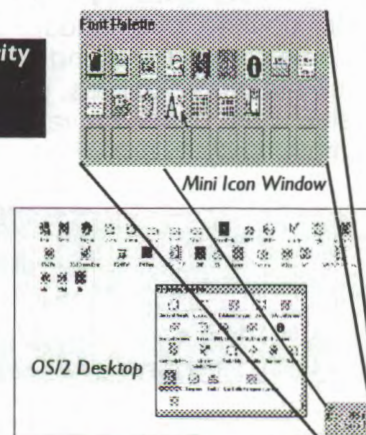
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FILES

This module now focuses on the file dialog boxes only. Previously, the functions in the module would not only prompt the user for a filename, but they would also read or write the data. To keep things modular, the responsibility of file I/O (and file I/O errors) has been placed on the function which calls this module.

Currently, the only module which performs any file I/O is TERRAIN, and the routines for opening and saving maps are there.

GAME

Thanks to the WM_MINMAXFRAME message, the info box is now hidden/shown when the main window is minimized/restored. For this message, the 'mp1' parameter is a pointer to a SWP structure, which contains quite a bit of information about the window's new size and position.

The Move and Target modes have been combined. The left mouse button moves the 'Mech as before, but now the right button is used to target. Edit mode works the same as always.

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HEXES

All of the targetting-specific functions have been moved out of this module and placed in TARGET, where they belong. The list includes function HexHighlight() and HexFirstSide().

In a previous issue, I mentioned that the presentation space handles created with WinGetPS() are cached-micro spaces, and therefore should only be used for a short-term drawing. To ensure this restriction, all functions in this module that perform any drawing now take an HPS parameter. OS/2 allocates a limited number of these presentation spaces in a cache (hence the name). If the cache is fully allocated, then WinGetPS() will return a NULLHANDLE.

The new function HexOutline() is used to highlight a hexagon by drawing its outline. All hexagons have a one-pixel border between them. The thickness of the border is determined by the XLAG and YLAG constants defined in HEXES.H.

In the next installment, however, the hexagonal grid will be removed. This is easily accomplished by setting XLAG and YLAG to one, instead of the current value of two. It seems that the hexagon borders are screwing up the targetting path algorithm. Sometimes the targetting line squeezes between two or three hexagons, and the routines which determine the path get confused.

Unfortunately, without a grid, the player will not be able to distinguish individual hexagons. As a remedy, the info box will be expanded to always show the hex index under the mouse pointer, and a ruler will be drawn around the combat map.

MECH

The only addition is function ShowPosition(), which shows the BattleMech's current position.

MENU

The changes in this module reflect the changes in module FILES. The functions that actually load and save maps are in module TERRAIN. The "File" menu now has the option to save the current map and to quit the program. The "close" option is also present but has not yet been implemented.

TARGET

This month introduces yet another attempt at the targetting path algorithm. In most situations, the path is correctly outlined, but there are still cases where breakdown occurs. Strangely enough, the targetting path is not symmetric about a column. For example, the targetting path from (7,7) to (13,11) is not the same shape as the

path from (7,7) to (1,11). One possible cause for this aberration is that the coordinate returned by HexMidpoint() may not be the exact center of the hexagon.

The low-level functions for the targeting path have been placed in submodule TARGET0. This module contains the hex highlighting routines (formerly in HEXES) and all the functions which calculate the targeting path.

The problem with the previous algorithm was explained in issue seven: it's too accurate. Hexagons which were only touched or briefly entered were being included, even though they had no significant impact on the visibility. These hexagons are called insignificant. Remember, the whole point behind the targeting path is to determine the visibility of the target.

To explain a solution to this problem, three new definitions are introduced:

True exit side — the exact side through with the targeting line exits.

Redirection — the act of selecting an alternate hexagon for a better targeting path. The normal procedure would be to use the true exit side. However, in certain cases, a neighboring side might produce a better targeting path that more accurately represents the true visibility of the target. If a different exit side is chosen, then redirection is said to have occurred.

Vertex redirection — a redirection technique based on whether the targeting line exits near a vertex of the hexagon. If it does, then the slope of the targeting line is compared to the slopes of the radii of the exit side and its neighbor. The closest match determines which exit side is actually chosen.

Figure 1 shows a condition where this technique works. Normally, the targeting path would jump from (0,2) to (1,1) to (1,3) to (2,2). With vertex redirection, hexagon (1,1) is skipped, and the resultant path is smoother.

Figure 2 shows a condition where this technique does not work. The slope is so shallow that the targeting line never enters hexagon (1,3). Once the algorithm jumps to that hex, it no longer knows where to go. So it just gives up and terminates, leaving the targeting path incompletely drawn on the screen.

The only solution would be to backtrack and try a different path. However, I will put the targeting path algorithm to rest for now. Perhaps a more adventurous soul would want to pursue this further?

I had the opportunity to test the game on an XGA-2 system. Drawing the combat map is certainly much quicker than on my VGA system. However, the background highlighting of the source hexagon during targeting does not work properly. Function Highlight(), which uses a color-cycling technique if the screen sup-

ports more than sixteen colors, is too CPU intensive.

The targeting path could not respond to mouse movements quickly enough. Adding another DosSleep() call in function DoHighlight() alleviated the problem. A better solution would be to temporarily disable this thread while the main thread is redrawing the targeting path. This enhancement can be accomplished by using semaphores. Look for it in a future issue.

TERRAIN —

This module now handles all combat map functions. Previously, module HEXES handled map drawing, and module FILES handled the file I/O.

All the functions in this module are self-sufficient. They obtain the file name, if necessary. If an error occurs, they display the proper error messages. After a successful "open" or "save as" operation, the window title is automatically changed. There is no need to return any error condition.

WINDOW

Function WindowSetTitle() sets the title that is dis-



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played in the title bar window. The parameter that is passed is the name of the current map. A null string is used to represent an unnamed map.

/* FLAME ON */

I am reserving the last few inches of my column for an open discussion of OS/2 issues. Here is an opportunity for users and developers alike to have their voices heard.

This past December, I noticed a bug in OS/2's keyboard driver. IBM has a CompuServe E-mail address for reporting bugs. The procedure is to obtain the bug-report form, fill it out completely, and send it to the proper address. Since I don't have a CompuServe account, I sent the form via Internet. So far, so good.

The response I got was that IBM no longer supported Internet customers, and that I should use other means to report the bug. In effect, I was being forced to pay money to tell IBM about a bug in their software.

Things are back to normal now. Apparently, there was enough commotion, both inside and outside IBM, to reverse that decision and allow Internet users to report bugs. About four weeks after I initially reported the prob-

lem, a diskette with the new keyboard driver arrived in my mailbox. My computer is much happier now. And so am I.

The moral of this story is: users who are reporting bugs are doing you a favor, so make it easy for them. Do not force them to communicate with normal technical support channels, since they are not asking for technical support. Fortunately, IBM's support department is the best I have ever seen, but there are plenty of other companies out there which could use some improvement.

Next Month

New window design, a cool opening screen, and maybe some experimentation with IBM's new C++ compiler.

Timur Tabi is a graduate student in computer science at the George Washington University. He is also the new maintainer of the OS/2 and DOS Games list. He can be reached at 11811 Federalist Way #2; Fairfax, VA 22030, on Internet at timur@seas.gwu.edu, on Bitnet at if402c@gwu-vn, and on Fidonet at 1:109/347

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L1 MAIN_NRM.C

```

MRESULT EXPENTRY ClientWndProc (HWND hwnd, ULONG msg, MPARAM mp1, MPARAM mp2)
{
    HPS hps;
    RECTL rectl;
    SHORT cx;
    SHORT cy;

    switch (msg)
    {
        case WM_CREATE:
            /* window setup stuff */

        case WM_PAINT:
            hps = WinBeginPaint (hwnd, (HPS) NULL, (PRECTL) NULL);
            WinQueryWindowRect (hwnd, &rectl);

            /* fill in the paint routine */

            WinEndPaint(hps);
            break;

        case WM_SIZE:
            /* note, it is better to fill in an array SWP structures
            ** and do a WinSetMultWindowPos. For q & d or a single
            ** window the would work...
            */

            cx = SHORT1FROMMP(mp2);
            cy = SHORT2FROMMP(mp2);

            WinSetWindowPos (hwndChild1, HWND_TOP, 5, cy/2, cx/2-10, cy/2-10, SWP_MOVE | SWP_SIZE);
            WinSetWindowPos (hwndChild2, HWND_TOP, cx/2+5, cy/2, cx/2-10, cy/2-10, SWP_MOVE | SWP_SIZE);
            /* etc for the rest of the windows */
            break;

            /* the rest of the messages processed by the window go here */

        default:
            return (WinDefWindowProc (hwnd, msg, mp1, mp2));
    }

    return (MRESULT) 0;
}

```

```

MRESULT EXPENTRY Child1WndProc (HWND hwnd, ULONG msg, MPARAM mp1, MPARAM mp2)

```

```

{
    PSZ pszStuff = "Child Window 1";
    HPS hps;
    RECTL rectl;

    switch (msg)
    {
        case WM_PAINT:
            hps = WinBeginPaint (hwnd, (HPS) NULL, (PRECTL) NULL);
            WinQueryWindowRect (hwnd, &rectl);
            /* and the rest of paint stuff */
            WinEndPaint(hps);
            break;
            /* the rest of the messages processed by the window go here */
        default:
            return (WinDefWindowProc (hwnd, msg, mp1, mp2));
    }

    return (MRESULT) 0;
}

```

```

/* And so on for the rest of the windows in the application */

```

L2 MAIN_OOP.C

```

#define INCL_WIN
#include <os2.h>
#include <process.h>

#include "oomacros.h" /* the OO macros to simulate a method */
#include "oodemo.h" /* function headers, etc */

void main(void)
{
    QMSG qmsg;

    ULONG fcf = FCF_STANDARD & -FCF_ICON & -FCF_ACCELTABLE & -FCF_MENU;
    HAB hab = WinInitialize (0);
    BOOL brc = RegisterClassMain (hab);
    HMQ hmq = WinCreateMsgQueue (hab, 0);
    HWND hwndFrame = WinCreateStdWindow (HWND_DESKTOP, WS_VISIBLE, &fcf, CLASS_DEMO,
        "Main Window", 0, (HMODULE) 0, 0, (HWND) 0);

    while ( WinGetMsg(hab, &qmsg, 0, 0) )
        WinDispatchMsg(hab, &qmsg);

    WinDestroyWindow(hwndFrame);
    WinDestroyMsgQueue(hmq);
    WinTerminate(hab);
    exit(0);
}

BOOL RegisterMainClass(HAB hab)
{
    return (WinRegisterClass(hab, CLASS_CHILD, MainWndProc, CS_SIZEREDRAW, 0));
}

```

L3 WND_NRM.C

```

#define INCL_WIN
#include <os2.h>

```

```

#include "stddemo.h" /* prototypes etc */

```

```

ULONG fcf = FCF_STANDARD & -FCF_ICON & -FCF_ACCELTABLE & -FCF_MENU;

```

```

PCHAR szClassClient = "A_Window_Class"
, szClassChild1 = "A_Child_Window"
, szClassChild2 = "Another_Child"
, (as many more as needed);

```

```

HWND hwndFrame, hwndClient, hwndChild1, hwndChild2;

```

```

void main(void)

```

```

{
    HAB hab;
    HMQ hmq;
    QMSG qmsg;
    SWP swp;

    hab = WinInitialize (0);

    WinRegisterClass (hab, szClassClient, ClientWndProc
        , CS_SIZEREDRAW | CS_CLIPCHILDREN, 0);
    /* and the rest follow */

    WinCreateMsgQueue (hab, 0);
    WinCreateStdWindow (HWND_DESKTOP, WS_VISIBLE, &fcf, szClassClient, "Standard stuff", 0L
        , (HMODULE) 0, 0, &hwndClient);
    WinQueryWindowPos (hwndFrame, &swp);
    WinSetWindowPos (hwndFrame, HWND_TOP, swp.x, swp.y, swp.cx+1, swp.cy+1
        , SWP_MOVE | SWP_SIZE | SWP_ZORDER);

```

```

    while ( WinGetMsg(hab, &qmsg, 0, 0) )
        WinDispatchMsg(hab, &qmsg);

```

```

    WinDestroyWindow(hwndFrame);
    WinDestroyMsgQueue(hmq);
    WinTerminate(hab);
}

```

...

L5 WND_OOP.C

```

#include "oomacro.h"
#include "oodemo.h"
METHOD(mainWndProc)
{
    switch (msg)
    {
        case WM_CREATE:
            return (METHOD_CALL(fnmCreate));
        case WM_PAINT:
            return (METHOD_CALL(fnmPaint));
        case WM_SIZE:
            return (METHOD_CALL(fnmSize));
        default:
            return (METHOD_CALL(WinDefWindowProc));
    }
}

METHOD(fnmCreate)
{
    /* we could also add a table of pointers to the various method functions to provide virtual methods. Then query
    the window words of the window in hwnd to get the pointer to its methods */
    int
    i;
    PCTRLDATA pctrltda;
    static WINDOWCOLOR colors[] =
    {
        {CLR_YELLOW, CLR_RED},
        {CLR_YELLOW, CLR_BLUE}
    };
    /* and so on, as many as needed
    * We show color, here, but it could/should be any data that has to get passed to the window(s). */
    DosAllocMem((PVOID) &pctrltda, sizeof(CTRLDATA), PAG_READ | PAG_WRITE | PAG_COMMIT);
    for (i = 0; i < number_of_windows_to_create; i++)
    {
        pctrltda->ulID = i+1;
        pctrltda->ulForegndClr = colors[i].ulForegndColor;
        pctrltda->ulBackgndClr = colors[i].ulBackgndColor;
        WinCreateWindow (hwndnd, CHILDCLASS, NULL, WS_VISIBLE, 0, 0, 0, (HWND) 0, HWND_TOP
            , 0, (PVOID) pctrltda, NULL);
    }
    DosFreeMem(pctrltda); /* the child should make its own copy */
    return 0;
}

METHOD(fnmPaint)
{
    HPS hps;
    RECTL rectl;
    hps = WinBeginPaint (hwnd, (HPS) NULL, (PRECTL) NULL);
    WinQueryWindowRect (hwnd, &rectl);
    /* and the rest of paint stuff */
    WinEndPaint(hps);
}

METHOD(fnmSize)
{
    /* note, it is better to fill in an array SWP structures and do a WinSetMultWindowPos. However, this is q & d.
    */
    cx = SHORT1FROMMP(mp2);
    cy = SHORT2FROMMP(mp2);
    WinSetWindowPos (hwndChild1, HWND_TOP, 5, cy/2, cx/2-10, cy/2-10, SWP_MOVE | SWP_SIZE);
    WinSetWindowPos (hwndChild2, HWND_TOP, cx/2+5, cy/2, cx/2-10, cy/2-10, SWP_MOVE | SWP_SIZE);
}

```


USER GROUP INFO

There's probably some truth in being in the right place at the right time. There I was chatting with folks like Vicki Conway and Bill Wyatt of IBM and Esther Schindling. Jerry Fyffe and I were just about to make the six hour drive back to San Diego through the desert, but we were side-tracked when an enthusiastic guy walked in with a "press badge" — Joel Siragher. I showed him what we had done with our newsletter and displayed the INF version of the February issue. Joel mentioned he has wanted to spotlight the OS/2 user groups in OS/2 Monthly from the start.

I've been following OS/2 for a while now — scanning Fidonet messages and noticing some traits about OS/2 user groups. They seem to be formed by people who have not been a part of a user group before. Because of their interest in OS/2, they became active in getting people together to share ideas and information.

Our group officially had its first meeting in August 1992. Like many other OS/2 groups, we've started meeting in local IBM facilities. But even before that, there was a catalyst to get the group in motion. Enter Craig Swanson. When I first started getting interested in OS/2 2.0, I logged onto his "OS/2 Connection BBS". From there, we exchanged comments, notes, ideas, etc. Besides attending school and work, he took on the project of forming the group. His BBS has just about any OS/2 related file you could think of.

A few months before our first meeting, the seeds for the group were planted. An OS/2 2.0 seminar put on by our local San Diego Computer Society. It was held on a Saturday from about 9am to well past 7pm. A nominal fee of \$10 was charged. We had approximately 50 people show up. Imagine someone voluntarily giving up a Saturday to learn something like OS/2? We had an

excellent 40 page handout covering areas like installation concerns, deciphering the CONFIG.SYS file, tips, etc. And during breaks, folks just wandered naturally over to the PC's fur-

*This Month:
Dave Sichak
The San Diego
OS/2 UG*

nished by the local IBM office and running OS/2 for users to try their newly gained knowledge.

One problem we tackled was getting the news out about our group's meetings. We put notices in our local weekly free computer magazine. We made up one page flyers to drop off at stores. But, we seemed stagnated at about 30 attendees.

Along the way, we kept hearing talk about how nice it would be to have a newsletter. Unfortunately, I'm the type who will sometimes get tired of listening to talk and take action to get something done. For our December meeting, I told Craig I was doing a demo newsletter. Then he became a good spotter of items of interest on Fidonet and elsewhere. This enabled us to get dialogs going with other people and users who freely give their advice and

experiences. Doing a newsletter is no easy task. I started with 10 pages, went to 14, then 16 and March was 20. I think Craig has a secret desire to rival PC Magazine.

In January, I tried to see if I could use the newsletter as a marketing tool for our group. I dropped off several copies at local computer stores. Something must have clicked — we had nearly 70 people show up! Standing room only! In February, we had a terrible rain storm and still had over 50 people show up.

We wanted to make our "news" easier for others to get and allow them to learn about OS/2. I decided to create an OS/2 INF version of our newsletter using the Toolkit on the OS/2 PDK CD-ROM. The January issue was done along with a straight ASCII version. We've distributed it via Fernwood and we've gotten many kudos. Unsure how to view an INF file? Take a look at the settings in any of the items in your OS/2 Information folder — just copy one and change the settings to refer to another INF file you want to view.

What other opportunities are there for getting new members for your group? I'll admit - we missed one. IBM has a travelling OS/2 road show. I attended one in early January I think - over 100 people attended the session I went to. We missed the chance to have our group mentioned at these shows or to have flyers there or even our newsletters to pass out. We could have let people know they could further their interest in OS/2 with our user group. If one of these shows comes to your town — work with the local IBM office and get your group in the spotlight. But we've got the REXX Symposium conference coming up in San Diego in May.

[Continued in Next Issue]

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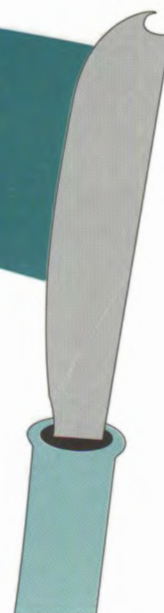
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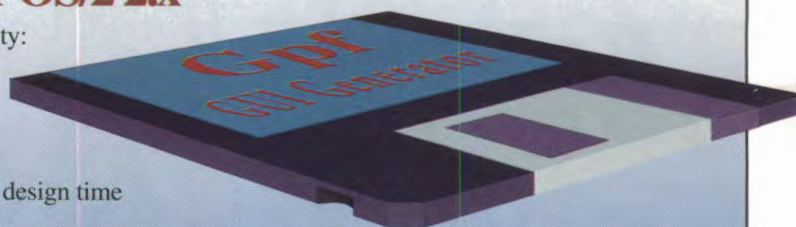
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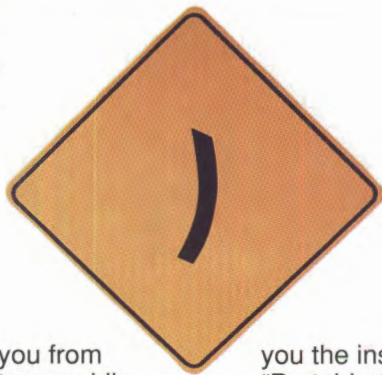
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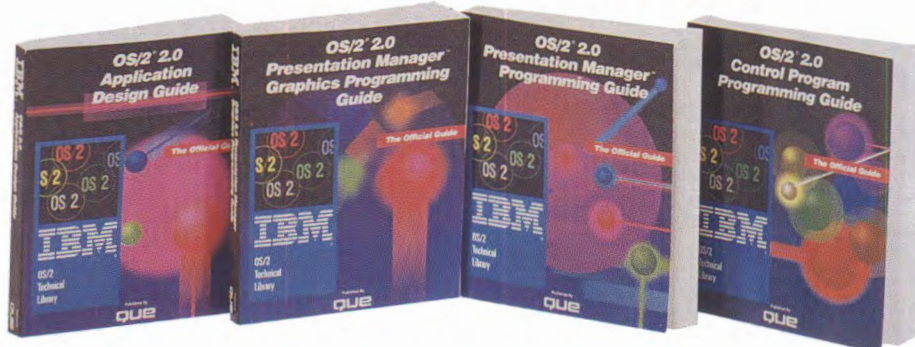
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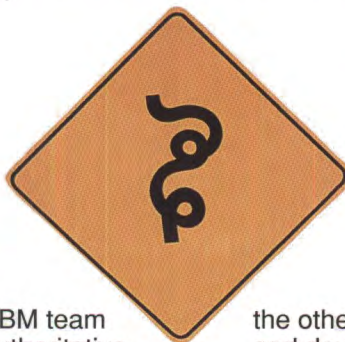
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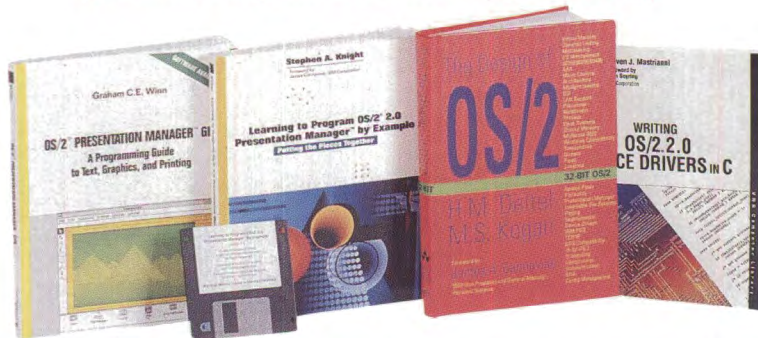
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